THE AUSTRALIAN PHASE

A magazine for Japanese Micros

Vol. 1 Issue No. 3   FEBRUARY/MARCH, 1985

PRICE: $3.50

PC'85 REVIEW — S1/30 REVIEW

IBM MONITOR CONVERSION

NEW BOOT PROGRAM

NEWS AND VIEWS

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COVER NOTES :

This month's cover brings us into the realm of the S1. It was produced using the Micro Easel painting program for the S1. The program uses the mouse and icons to make painting simple and the capability of the program is limited purely by your imagination. Output is of course in colour to the screen, but screen dumps to the printer are supported and each colour is replaced with a different pattern so that the printer image is representative of what is seen on the screen. The program comes with a number of examples to show you what is possible. The cover illustration is one of the example images supplied.

Better yet is the release of a keyboard controlled version for people who would rather not acquire a mouse. Not as much fun but still a very worthwhile program.

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Editorial:

The editorial this month will be short and sweet. The past month has been one of consolidation, with the preparation of manuals for software products consuming the bulk of my attention. Consequently there is little in the way of new software this month. There will be several new items released during the next few weeks.

The variation in international exchange rates over the past month has played havoc with the pricing of imported equipment, hence the price of equipment imported by The Australian Phase has varied up and down substantially during this period. The prices of hardware items quoted in the product catalogue are tied to the current exchange rate so they vary with the changes in the rate. I believe that the prices quoted by PHASE are the best available when you consider the bundled software.

PHASE has continued the policy of PUN in bringing you the news of the latest developments in Hitachi hardware at the earliest opportunity. This month's issue includes a review of the new S1/30 micro and next month's issue will review the new 16 bit Hitachi product the Hitachi B16-EX. Not content with a look at the new machines; each has been pulled apart and photographed so you get to see the internals and judge for yourself whether they meet the usual high standards.

In response to last month's editorial I have received a few contributions for articles, but more are needed. Perhaps its time to put pen to paper and tell us all what you have done with your Peach. I have a few details of interesting applications which will be revealed to you over the next few issues. Remember, contributions are always welcomed.

That's all folks,

Wayne Hobden

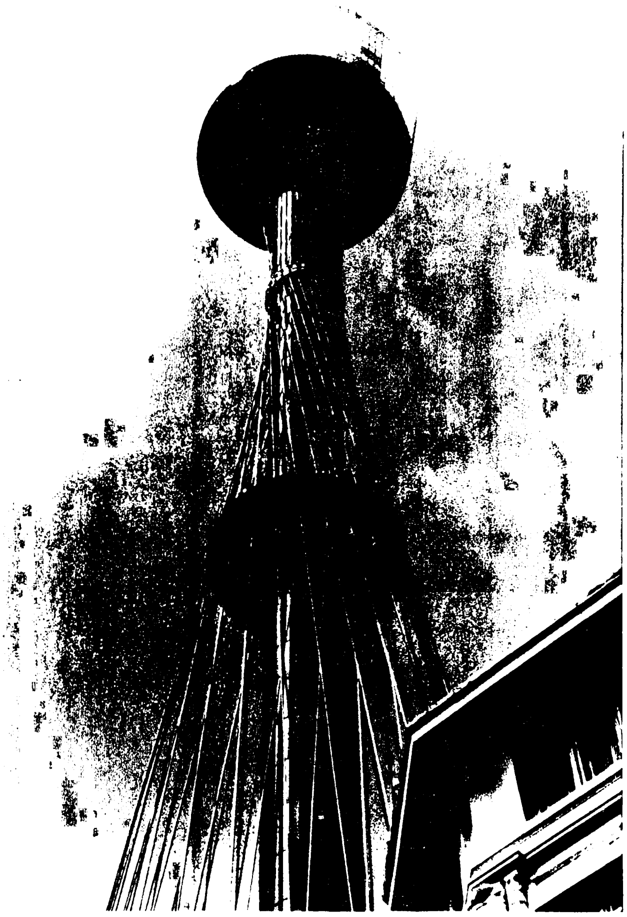
DOLOOP

The only release from PHASE this month is the keyboard version of MICRO EASEL for the S1 micro. See details of this product in the Addendum to the Product Catalogue. Incidentally this catalogue will not be reprinted every month, but rather quarterly. However, every month any additiona to the catalogue will be printed and any errata noted. The addendum to the catalogue is several pages this month, so don't forget to attach it to your existing copy.

Others have been busy and released several new products for the MB-6890. These are DBCMDS Version 2.0 which locks commands into the top 8K RAM of the bank switched card. Within days of receiving a demo copy of the new DBCMDS disk I receive a copy of BANKLIB an alternative to the new version of DBCMDS. Banklib also uses the 8k bank of memory which is currently not utilised, but offers several significant alternatives to the method of operation of DBCMDS. I did not have sufficient space to review both offerings in this issue so I have held them back until the next issue and I will review them separately as well as give a comparison of their relative merits and deficiencies. A new listing of Public Domain software is also included in this issue together with the latest club news.

PHASE's organisational structure is undergoing changes and will result in improved service and turnaround of correspondence. So don't be disheartened about delays these will very quickly be eliminated and correspondence and orders dealt with on a turnaround basis. We look forward to receiving your letters so don't feel obliged to reduce my workload. PHASE will only prove to be useful whilst I have contact with the latest happenings and I can only do this through your letters.

ooOoo



PC - 85

LOOKING BEHIND THE SCENES.

by W.R.Hobden

Every year I look forward to visiting the computer shows, despite several disappointments in the past. The hope for the discovery of that ellusive perfect machine always overwhelms the nagging suspicion that this show will be no better than previous versions.

Thinking back, I believe the best computer show I ever attended was my first. At the time I was actively engaged in searching for the right machine to buy. Micro Computers were relatively new to me and the show proved to be full of wonderous sights and sounds of enormous potential. Leading from that show I bought my first micro and have never quite found Computer shows as useful or interesting since. The one exception being the 1984 Japan Electronics Show, of which the Consumer Electronics Pavillion was presented with such flair and advanced gadgetry that I was completely mesmerised. I suspect it was a twinge of hope that some examples of what was seen in Tokyo would find its way to PC85 that had raised my expectations (probably too high).

The intention to buy, certainly improves the benefit of a show, but there are now many of us who have bought already, have well and truely tried their machinery and now live in hope of something new happening which will promise respite from the shortcomings of the current machine. Very little has happened to convince me that the cost of changing brands will yet be worth the gain. It is the expectation of making this find that prompted me to attend PC'85. I can definitely state that I went home disappointed, at not finding that machine, but at least inspired with the capability of the McIntosh. But let's not jump the gun; what was PC'85?

The venue of the show was once again the Sydney Centrepoint Convention Centre. Many of the problems associated with the show relate to this site as a choice of venue as I find the stands far too restricted and the overall arrangement lacking in imagination. I will be extremely disappointed if the show is held in this venue next year. The quality of some of the exhibits at ACC'84 (held at the Horden Pavillion) showed what can be done when reasonable space is available.

I very quickly walked through the displays up to the computer clubs and cafeteria on the Executive level, and slowly worked my way back down to the exit. The club stands were of little interest to me, as they were mostly associated with the more common micros such as Atari's, Microbees and Texas Instruments. There was a regular parade of potential club members to the club stands and the show must have proved worthwhile to those clubs granted space.

The **Morrow PIVOT** was the first real discovery for me. This machine and the **OSBORNE 3** are almost identical. The PIVOT was obviously only a sample machine brought in for evaluation and previewed at PC'85. The micro is a true portable, compatible with the IBM PC, although it has several features of its own that distinguish it as a useful tool. The PIVOT/Osborne 3 uses a 16 line by 80 character display (which can be windowed as the top or bottom 16 lines of the full 25 line display). The mounting panel was clearly intended for a full 25 line LCD display and it is expected that a 25 line display will in deed be provided on models introduced in about 12 months time.

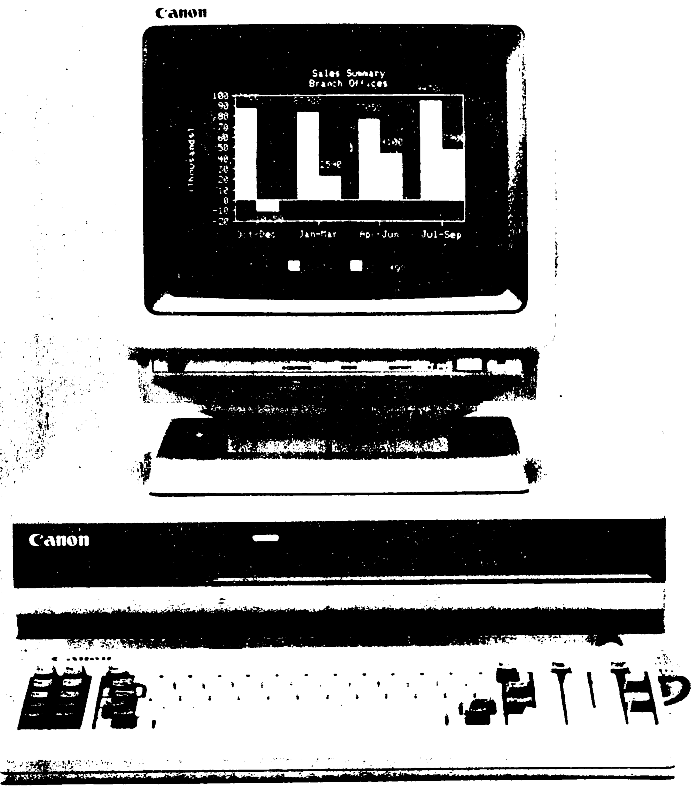
The PIVOT uses MS DOS, a 80C86 processor, has twin 5 1/4" drives, weighs 11.5 lbs (13 lbs with battery), 10 function keys; a fold down keyboard (63 alphanumeric keys and a full 22 key calculator overlay), a RTC clock and an inbuilt modem. The unit is designed to be quite compact and is 13 " wide, 5.6" deep and 9.5" high. The biggest innovation of the machine is the use of 4 special ICON soft touch keys. These keys, when pressed, permit the interruption of the current task and the performance of one of four utility programs. Pressing the same ICON again will return the user to the original program. The four icon utilities are a modem access, a world map real-time clock/calender with appointment diary, and a desktop calculator.

The price of $3500 is quite reasonable I suppose (but I will be waiting for a similar capacity unit to appear at approximately $1500.00 before I could justify buying one). The Osborne 3 also comes with a useful collection of bundled software.

The **Seiko Series 8600** Micro caught my eye at the TOMAS Systems stand. Very undersold, by the display, this unit attracted me initially by its very modernistic styling. I was very quickly to discover that this was more than skin deep. The machine fits a very specialist area of the micro computer market. It is designed as a multi-user system which can be initially installed as a single user system and then gradually expanded as needs require. There is a very definite need for a machine of this type, where small businesses can wet their feet and gradually expand the commitment to micros as they grow. The only further investment to go multi-user is the acquisition of a suitable operating system. As supplied the system will already support four terminals.

But that's only half the story. Another revelation exists under the lid of the CPU box. Inside the box the unit is completely modularised. The hard disk unit can be installed/removed in seconds, without exposing anything else! The mother board is normally inaccessible as it is completely enclosed within its own compartment. The one let down with this machine is its price of $10000 for the base single user twin drive unit. Three further terminals can be added very inexpensively making a very cheap four terminal system, however the base price is prohibitive.

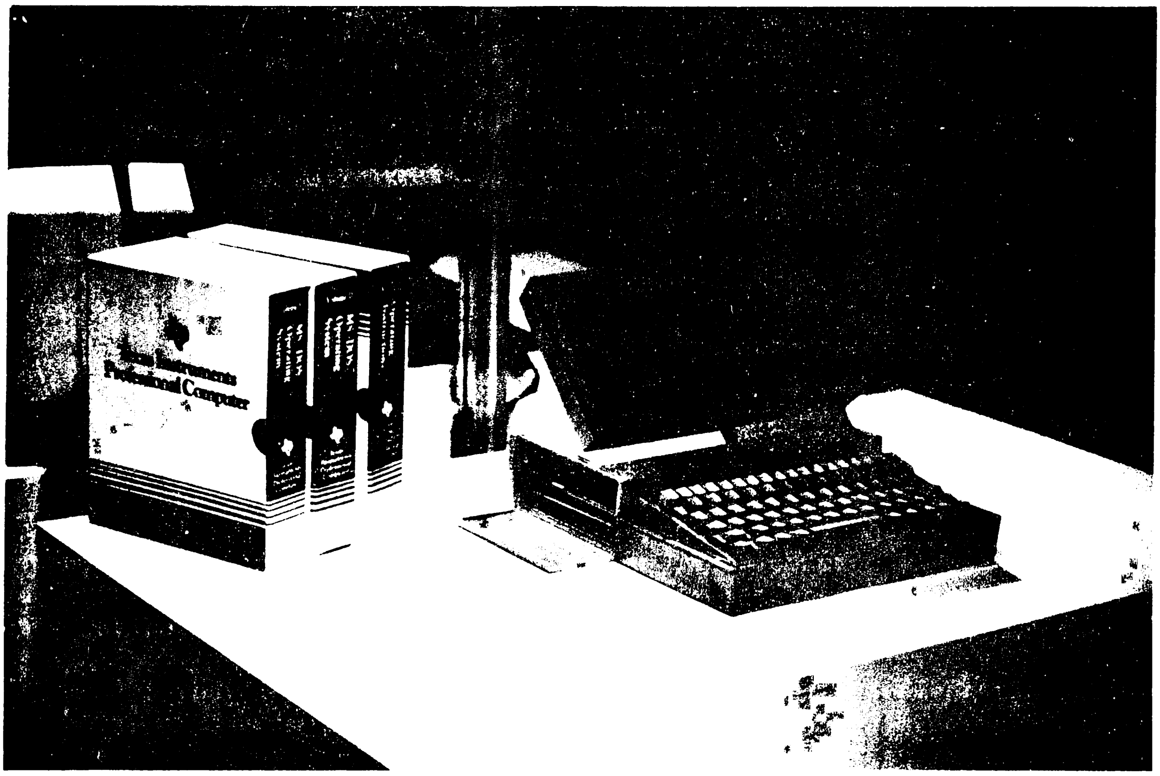
Wandering past the displays there were innumerable examples of IBM compatible micros. Even at this late stage in the P.C.'s development new examples of the IBM clone are being released. **CANON's A200** is one example.



The machine is very stylish but on its own account has little to offer to distinguish it from the IBM original, save promises from the manufacturer concerning user support. This is true of other machines such as the **ERICSSON PC.**

Sure some have more or less expansion ports, more or less standard memory capacity and various inbuilt features - but when you get down to what counts you have an IBM in a different box. Of course, this is my opinion, but the excessive desire for IBM compatibility has caused the micro computer industry a great setback. Too much concern is placed on being compatible with what in my own experience is a rather lack lustre machine. **Lets get back on the road to innovation!**

A computer that is now dated in terms of computer development times is the McIntosh. The magnificient design of this machine is so advanced that only recently have software houses started a flood of applications suited to the ability of the machine. A brilliant music synthesiser by Hayden Software is beyond description; visit your Apple dealer without delay. Database programs capable of saving graphic diagrams as well as text; the much lauded MACPAINT, MACDRAW, etc. The software itself is not the best part of this micro, nor is it the mouse, instead it is the attention paid to the software design. With this machine the software is forced to be "USER FRIENDLY" (Oh what a pity this term has been so abused in the past). I'm not totally sold on the McIntosh, far from it; it's too slow, it lacks colour, and as yet it lacks the breadth of support I would like. My main complaint with the device is the restricted access given to the internals of the machine and the operating system. I want my machine to be open to my own personalisation of its responses, and enhancement of features I personally develop. The McIntosh is, however, indication that my dream machine may just be around the corner.

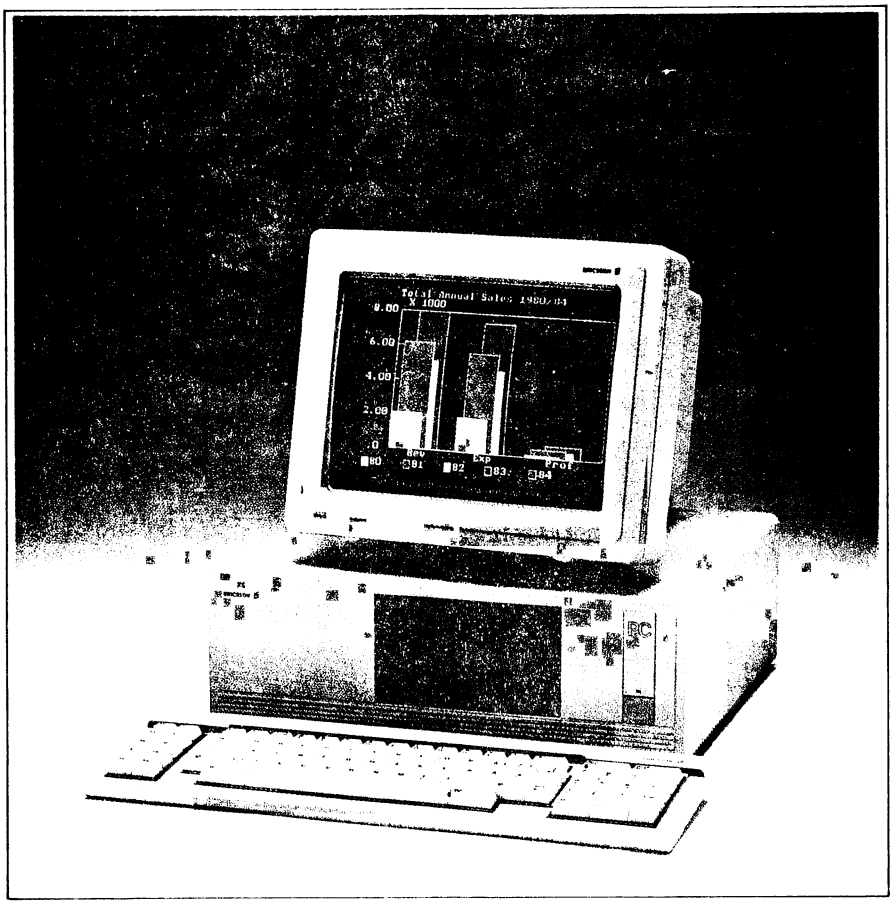


What could possibly compare with the McIntosh? Nothing at this show, but there were other machines. Another portable in the computer stakes was the **TI Prolite.** Fully compatible with the TI Professional this portable weighs just 10 1/2 lbs, has a 25 line x 80 character LCD display, 80C88 Processor, 720Kb disk drives, a 300 baud modem and runs all the software for the TI Professional. Quite a "professional" piece of kit the only failing of this machine is the $6500 price tag. Anyone paying this price is insane. I guess there must be quite a few qualifiers out there as TI have already taken orders. To my view $1500 is the top price I would pay for a portable, briefcase style micro, irrespective how good it is.

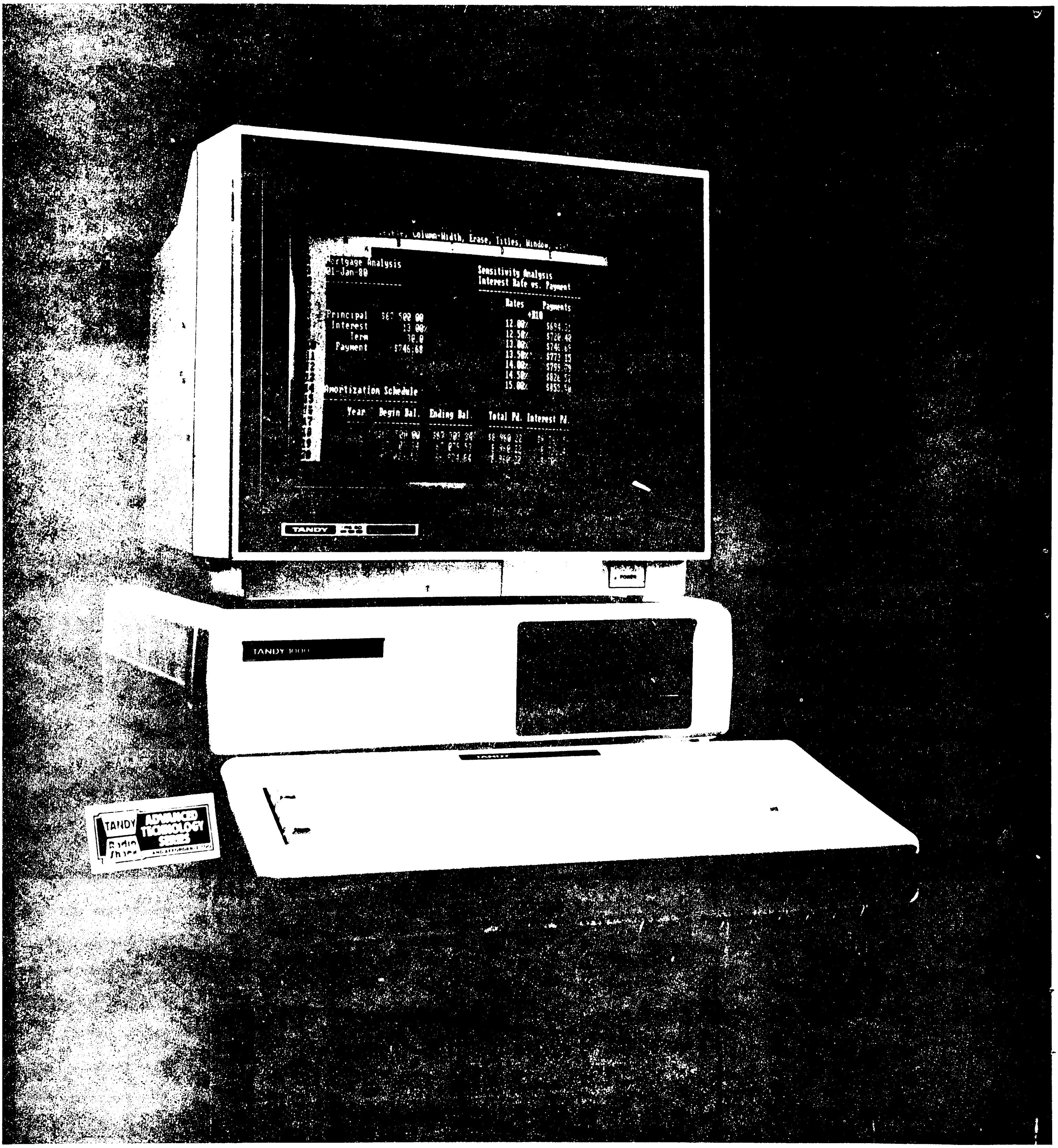
After all a portable is just a convenience tool and I don't think I would like it to replace my PC, especially since the portability aspect must have won out in the design compromise stakes. TI have been pouring a large ammount of resources into development of artificial intelligence interfaces to their Professional range. The release of Natural Link software at PC'85 is evidence of the success of this approach. Meant to operate as a front end for other vendors software (i.e. Wordstar, Multimate, etc.), to use natural link software construct a sentence with any of the choices you see on the screen. It translates your sentences into the proper commands. If you need help, just press a key to get some of the easiest to follow on screen instructions available.

ERICSSON, the Swedish telecommunications giant, has released an IBM PC compatible. Very stylish, the unit is a washed-out brown colour. Micros are certainly looking better these days and I am convinced this is a deliberate attempt to sway the impressionable. After all what self respecting micro owner would expect his/her micro to "look good". If it hasn't got a punched tape reader and hand entry boot-strap loader its not a micro! Don't laugh I used to do just that less than 10 years ago!!

The Ericsson PC



Oh well, fond memories! **Tandy** have at last woken from the deep slumber and released something worthy of reporting. Their new range of computers has at last brought them to the present. But alas the machinery offers no real innovation other than price. At $1999.00 I would grab one before the exchange rate drops again. Its not a bad looker either, but is shamefully plastic. The IBM when your not having an IBM. Somehow I think I would prefer to save up a little longer. **After all folks - you pays for what you gets.**


Column-Width, Erase, Titles, Window,
Mortgage Analysis
01-Jan-80
Sensitivity Analysis
Interest Rate vs. Payment
Rates
Payments
Principal
Interest
Term
Payment
Amortization Schedule
Year
Begin Bal.
Ending Bal.
Total Pd.
Interest Pd.
TANDY
TANDY 1000
TANDY
ADVANCED TECHNOLOGY SERIES
Radio Shack

Physically, apart from the disk drive, the S1/30 has a similar layout to the S1/10. The keyboard and earphone plugs are on the front panel, along with the sound volume control, the RESET button and the A/B System Switch. The Power On/Off button is a functionally large button to the top right of the front panel. The speaker grill adds to the functional appearance of the CPU. Photo 3 is a close up of the front of the unit.

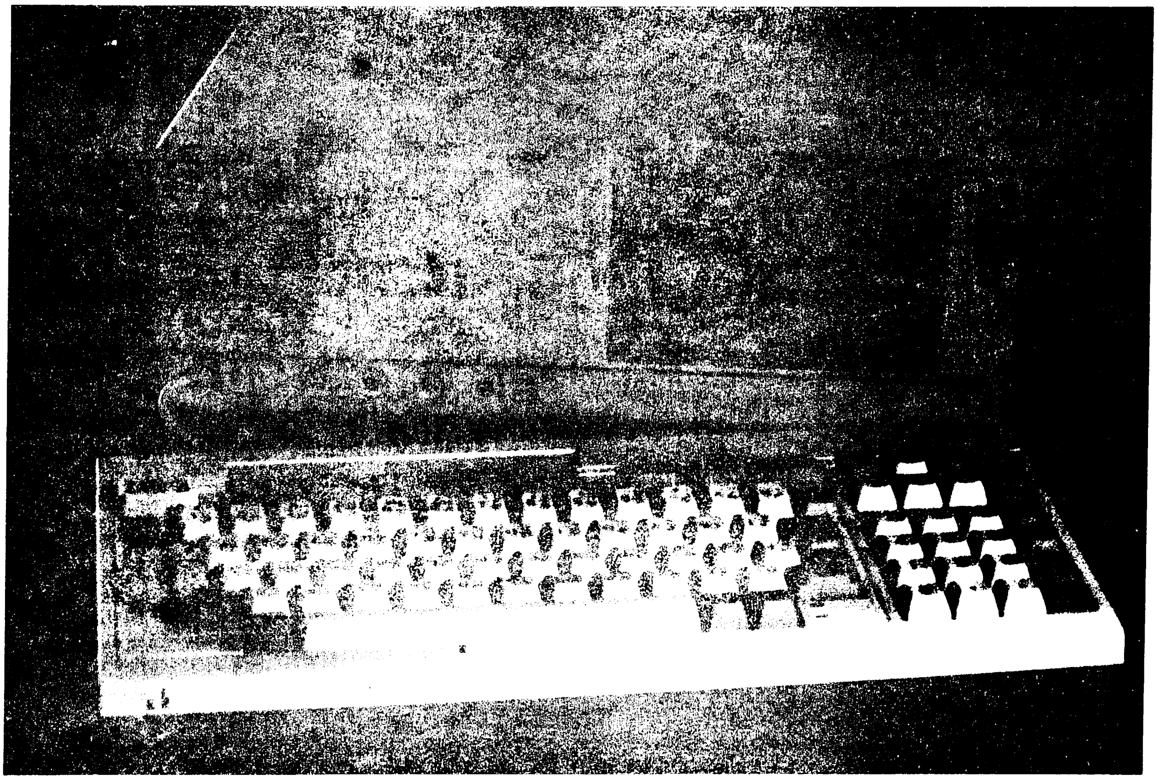


Photo 3

The keyboard is the same as that used on the S1/10. The keys are sculptured so that each key is curved and shaped to aid correct typing posture. Unfortunately, two fingered typists who type very fast will occassionally mis-hit a key at the wrong angle and it will not depress correctly. After a little adjustment you get used to the keyboard and it is quite satisfactory. The main advantage of this keyboard over the old MB-6890 keyboard, is the inclusion of the COPY, INS and DEL keys. Photo 4 shows a closeup of the keyboard. The inclusion of a "," key in the numeric keypad is also very useful.

The COPY key permits a screen dump to a printer (DOS mods are available for several printer types). Using the LCOPY command from BASIC even permits each colour from the screen to be represented by a different graphic pattern on single colour printers. The INS key puts the full screen editor into insert mode and this is a very worthwhile addition to the keyboard. The full screen editor allows any line of the program on the screen to be edited by simply moving the cursor (using the arrow keys) to the appropriate point and typing in the correction. The full screen editor is vastly improved by the listing speed of the S1. This permits very rapid scanning of the program to find lines to correct/edit. Initially the listing speed is daunting as the eyes aren't used to tracing the lines on the screen, but like most things you quickly adjust and going back to the MB-6890 is a real let down.

The DEL key allows text to the right of the cursor position to be deleted. This function is normally used in conjuction with the insert key.

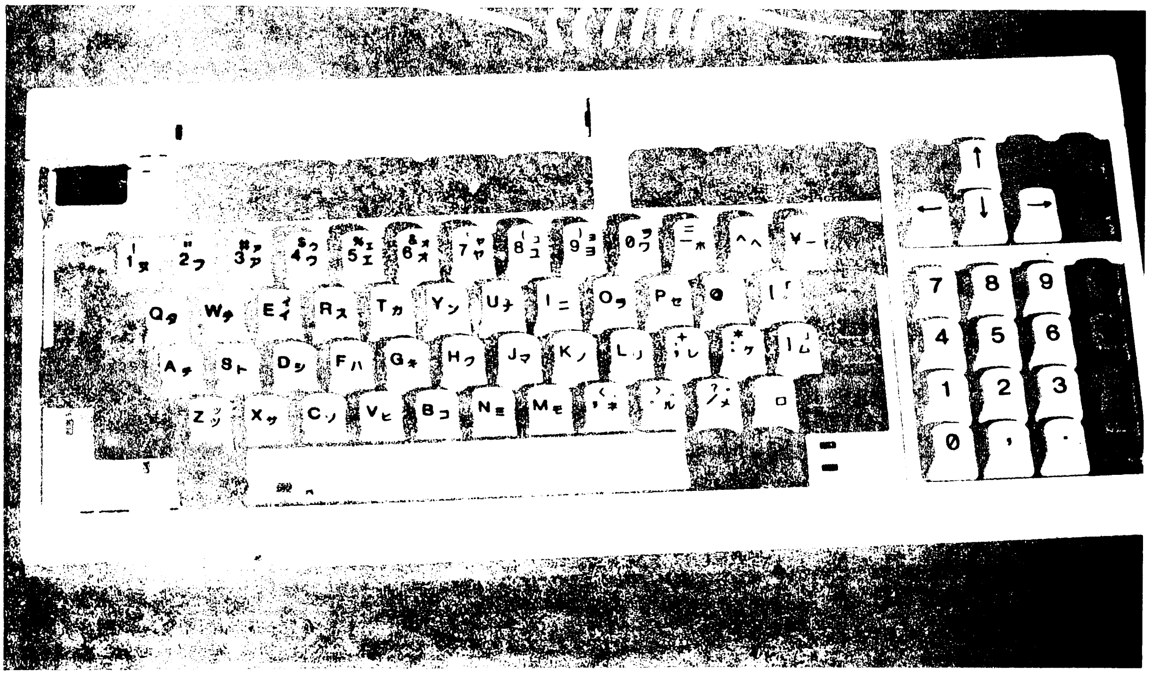


Photo 4

The Rear panel has been substantially changed from the S1/10. Only one set of expansion panels is provided to enable three cards from the older MB-6890 system to be fitted (see Photo5). Monitor, Cassette, Printer and Mouse ports are provided as standard. The RS-232 port can be fitted as a $30.00 option.

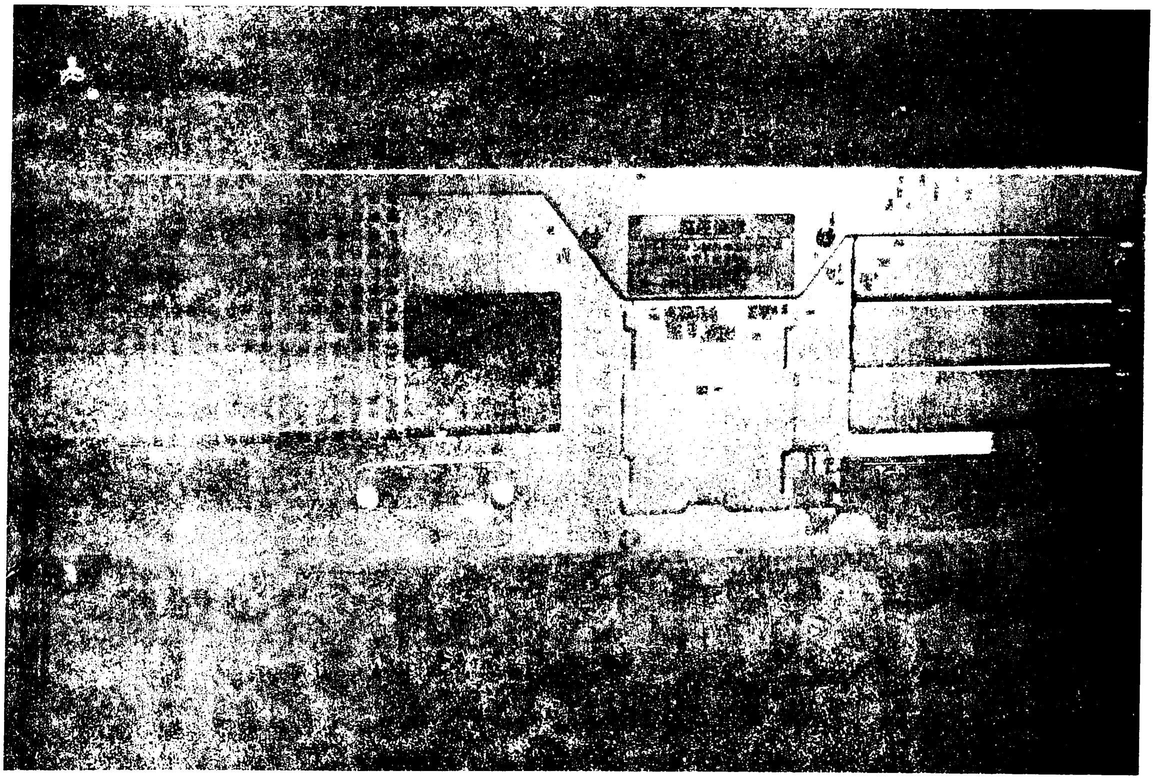


Photo 5

A large removable panel is provided for the video interface card. Unfortunately the video interface works with the NTSC system and is not suited to the system here. A set of chip switches is provided to preset the cassette baud rate from 300 baud to 2400 buad (with several intermediate settings).

The 2400 baud rate for cassette greatly improves the utility of the machine, and makes cassettes slightly more tolerable as a media.

The cover can be removed by unscewing a handful of phillips head screws. This is one of the annoying features of the machine, as I continually find myself adding or removing cards or pointing out features to friends and the need to remove all the screws is a real frustration. A spring clip arangement as used on the DEC Rainbow would be ideal. The noticeable improvement in the SI/30 is the rigidity of the frame with the cover removed. It gives the impression of being very solidly built, yet is made of the same pressed metal as used in the SI/10. Once the cover is removed the front panel unclips and four screws allow the disk drive to be removed (Photo 6).

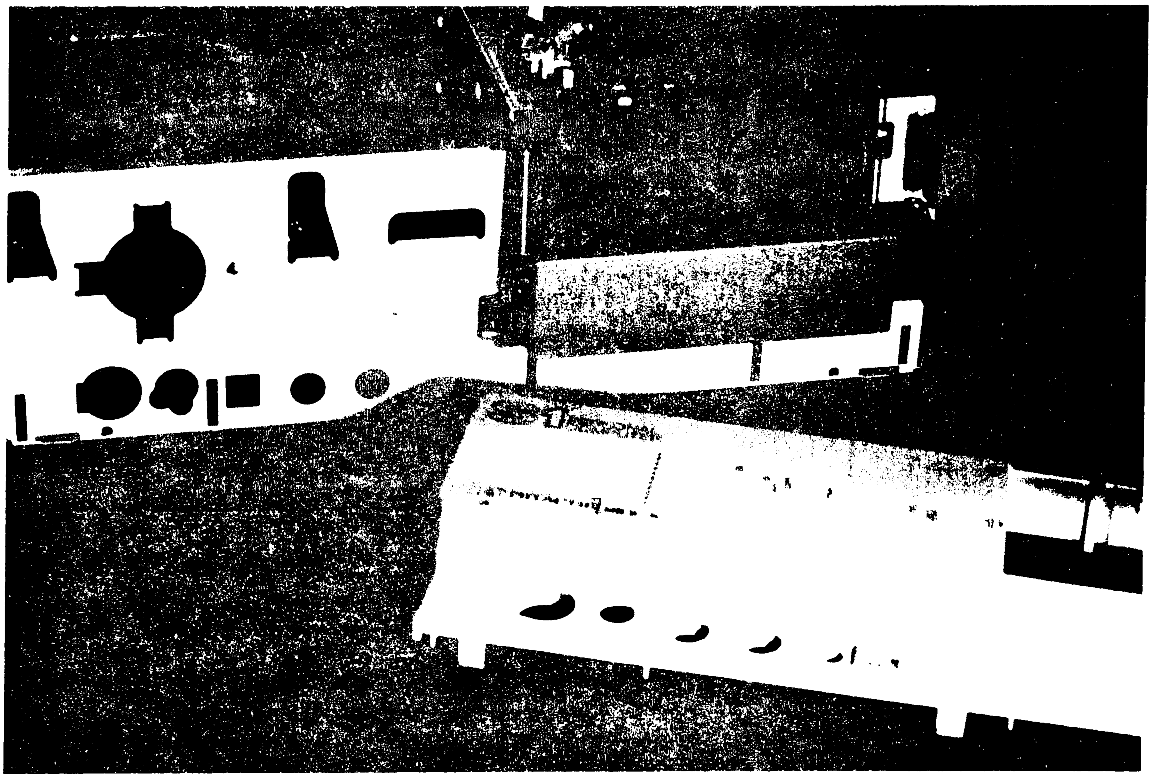
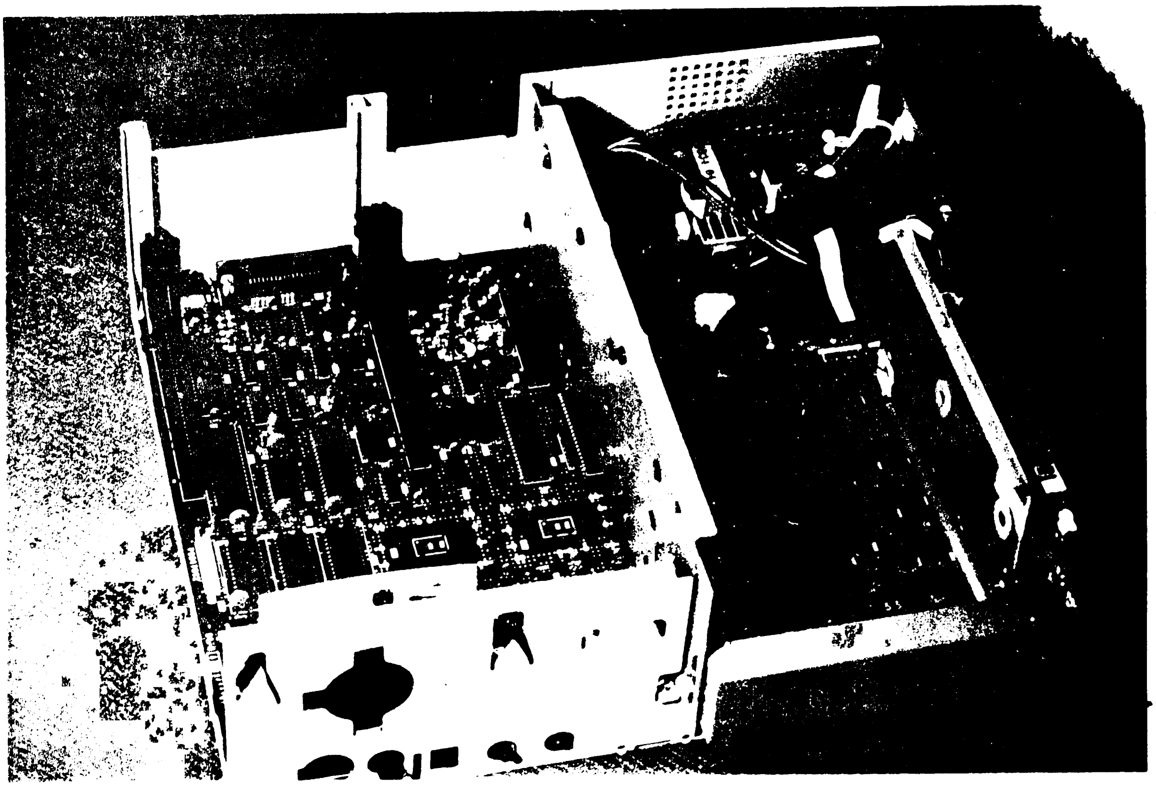
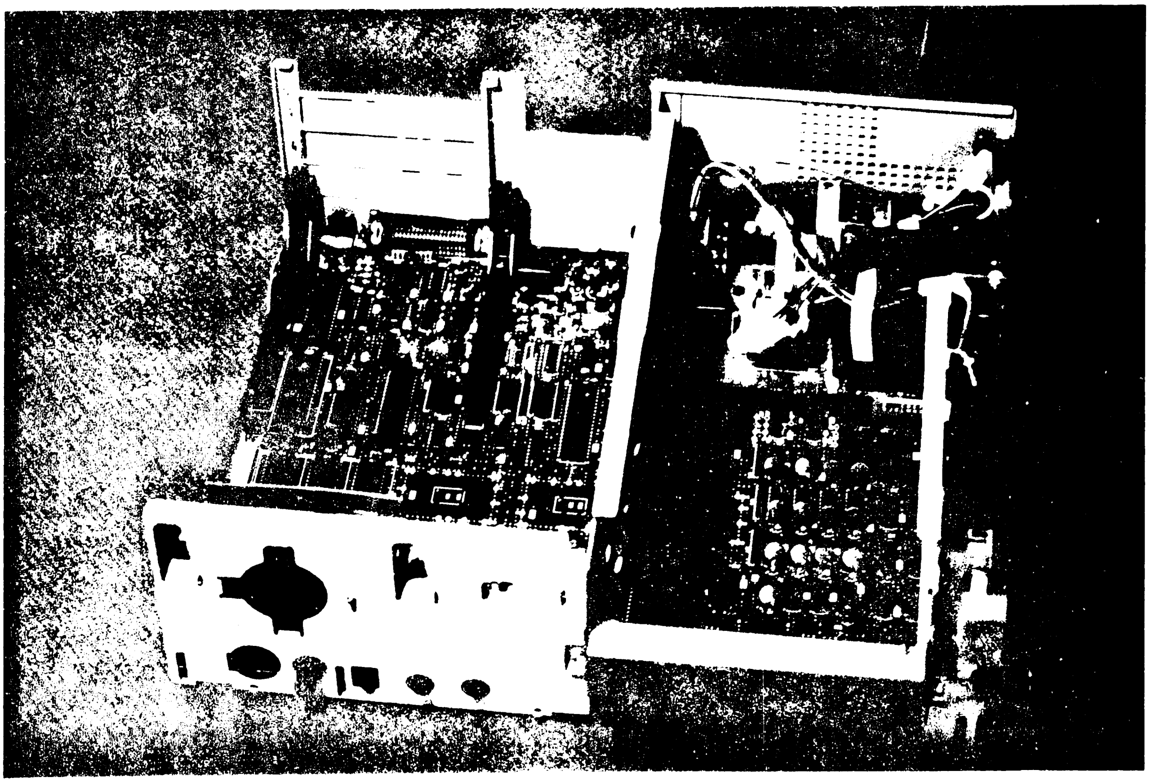
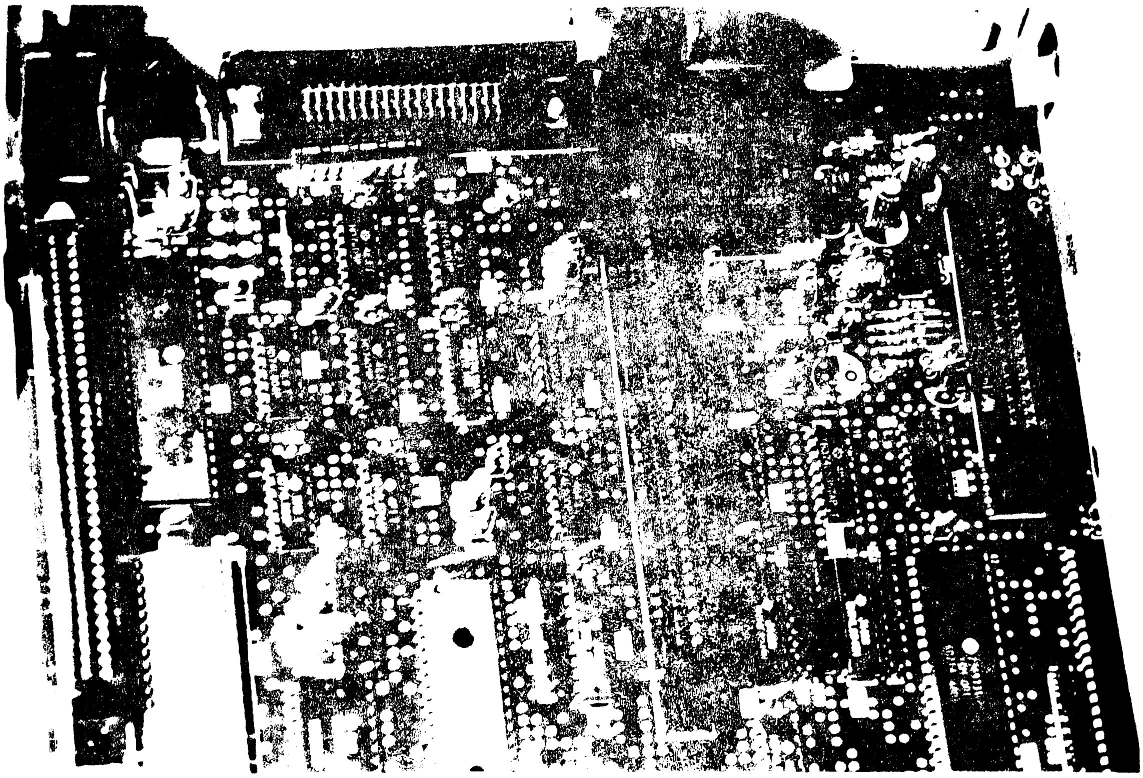


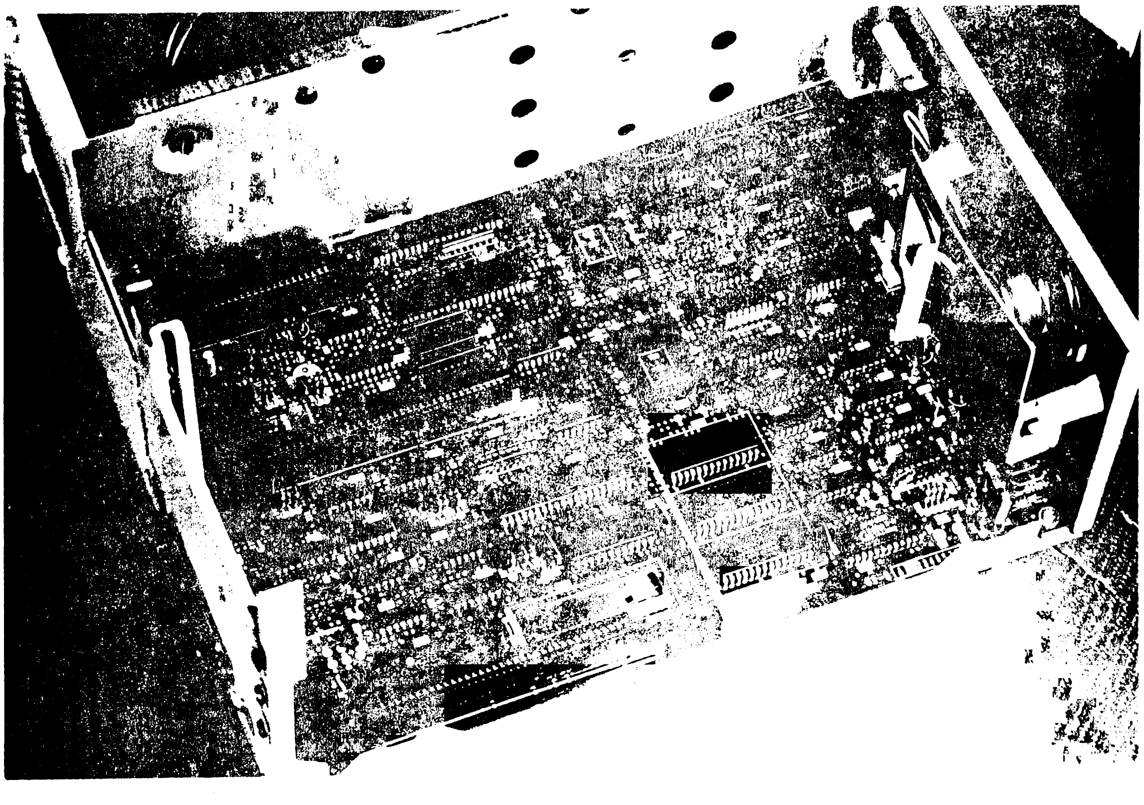
Photo 6

The disk drive and power supply are to the right of the unit (looking from the front) and are designed for easy removal. A small fan is provided to cool the drives and power supply however it is unlikely that this will assist with cooling of any expansion cards fitted as the metal frame of the drive supports would limit the air circulation. Some benefit would occur as the heat of the power supply would not contribute to the self-generated heat of the expansion cards. My SI/10 has been fully expanded for some time now and whilst it gets hot it does not seem to affect the operation of the unit.

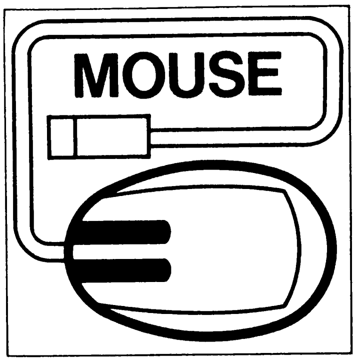






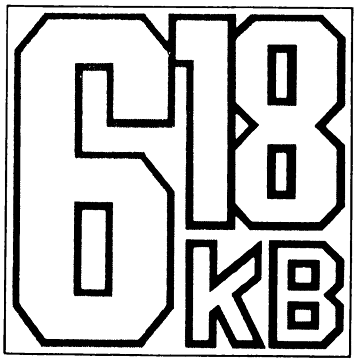


As you can see from the photographs, there are two large interface ports (72 pin) and, adjacent to the metal divider, is a smaller port for the video card. The two larger ports are used for the expansion cards. Into each of these may be plugged intermediate cards (EX01S, EX02S and EX03S) which offer a variety of expansion port arrangements. A maximum of six expansion cards can be fitted into the unit, but only three of these can be the old MB-6890 system cards as only three removeable panels are provided to accommodate the dust cover. Clearly it is expected that most of the cards fitted will not require external interfaces, i.e. would typically be RAM cards.



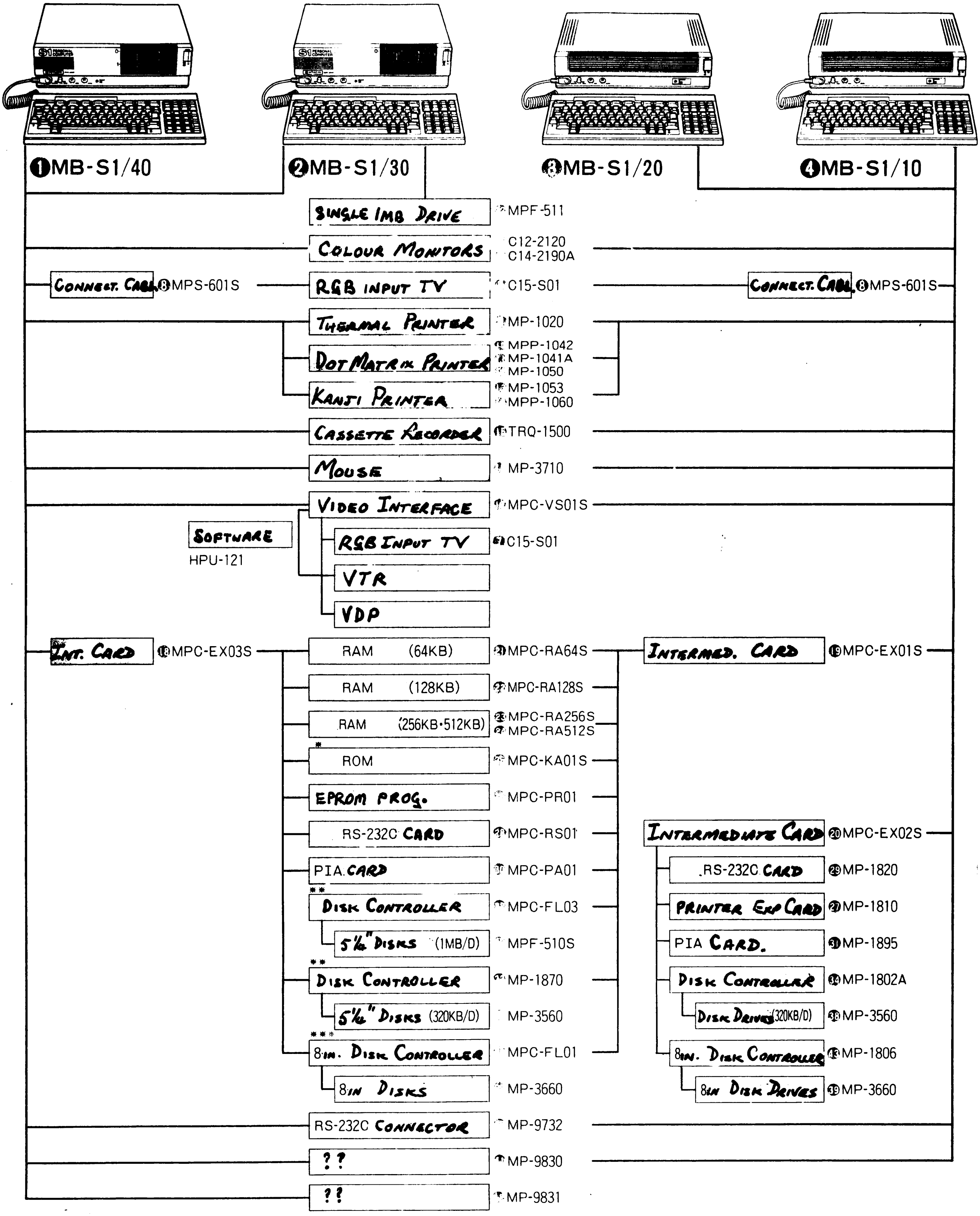
The disk controller card is fitted in the centre I/F port, and is a special card suitable for the 1 Megabyte drive. To the left of the unit is a vacant socket into which is plugged the LSI chip supplied with the MOUSE. Ah yes a mouse!! The mouse together with the MICRO EASEL program illustrates what can truely be done with an 8 bit micro.

It highlights the fact that it is not so much the speed or 16 bit power but mostly the memory capacity that makes 16 bit processors so powerful and the software so wonderful. With the S1 micro this power and capacity is available with an 8 bit micro. Quite a large array of expansion options is available and the reproduction (on the following page) from a pamphlet gives you some ideas of the combinations possible. For example the 106K Ram supplied with the standard unit can be expanded by 512K bytes to a grand total of 618K of user RAM.



There are several cards not shown on the system tree as these have only recently been completed. A voice recognition card is now available, along with an OS-9 Level 2 card, a Z-80 Card(6Mhz) and a Voice synthesis card. The Australian Phase has orders placed for these cards and will review them as soon as they arrive.

All right we have gone through the mechanics of the review what about experience with the machine? The inbuilt drive certainly reduces the number of boxes in the system but it does represent a major shortcoming. The single drive is a nuisance. All the utilities supplied support the single drive and prompt to change disks at the correct time, but a diskcopy operation took over 20 disk exchanges and left me weary from the effort.


①MB-S1/40
②MB-S1/30
③MB-S1/20
④MB-S1/10
Single 1MB Drive
MPF-511
Colour Monitors
C12-2120
C14-2190A
Connect. Cabl
⑧MPS-601S
RGB input TV
C15-S01
Connect. Cabl
⑧MPS-601S
Thermal Printer
MP-1020
Dot Matrix Printer
MPP-1042
MP-1041A
MP-1050
Kanji Printer
MP-1053
MPP-1060
Cassette Recorder
TRQ-1500
Mouse
MP-3710
Video Interface
MPC-VS01S
Software
HPU-121
RGB Input TV
C15-S01
VTR
VDP
Int. Card
MPC-EX03S
RAM (64KB)
MPC-RA64S
Intermed. Card
MPC-EX01S
RAM (128KB)
MPC-RA128S
RAM (256KB·512KB)
MPC-RA256S
MPC-RA512S
*
ROM
MPC-KA01S
EPROM PROG.
MPC-PR01
RS-232C Card
MPC-RS01
Intermediate Card
⑳MPC-EX02S
PIA Card
MPC-PA01
RS-232C Card
MP-1820
**
Disk Controller
MPC-FL03
Printer Exp Card
MP-1810
5¼" Disks (1MB/D)
MPF-510S
PIA Card.
MP-1895
**
Disk Controller
MP-1870
Disk Controller
MP-1802A
5¼" Disks (320KB/D)
MP-3560
Disk Drives (320KB/D)
MP-3560
***
8in. Disk Controller
MPC-FL01
8in. Disk Controller
MP-1806
8in Disks
MP-3660
8in Disk Drives
MP-3660
RS-232C Connector
MP-9732
??
MP-9830
??
MP-9831

Another more suttle difficulty is that the drives require the new 96 TPI HD (high density) 5 1/4" diskettes which, at the moment, are both rare and expensive. Ordinary DSDD 96 TPI disks are unsuitable. Once past these hurdles the drive operates well and is very quiet. The large capacity is very welcome and will be put to use in a database system I am developing. My recommendation would be to order your S1/30 with a second drive installed. It might cost another $600 but will prove to be money well spent.

From a software standpoint the utilities and demonstration programs supplied are identical to those released with the S1/10. Versions of all the software supplied by The Australian Phase and its supporting suppliers will be available in the HD disk format shortly.

A major limitation of the machine is that there is no Level 3 operating system for the 1 Megabyte drive format. Hence none of the existing Level 3 disk software can be used. For those not aware of the finer features of the S1/10, the system button on the front panel can be used to reconfigure the S1/10 as the older MB-6890; in the S1/30 it is only possible to run this system in cassette mode. The alternative is to remove the disk controller (hence disabling the 1 Mbyte drive) and connect MP-3550 DSDD drives together with a new disk controller, but this removes all the advantages of the new drives. Clearly System B, (the old MB-6890 mode) is intended purely for games playing, loading from cassette.

Apart from these restrictions the S1/30 is a very powerful 8 bit micro and is clearly ahead of any other 8 bit machine on the market. The utility software supplied demonstrates the flexibility of the machine by adjusting to the different machine configurations without need for the operator to interfere. For example, by adding an additional 64K memory card, the diskcopy utility will adjust by reading more of the source disk before copying across to the destination disk. With a 256K RAM card the 1 Mbyte drive can be copied in just four exchanges of the source and destination disks. This dramatically improves disk copying speed. Alternatively, with only a single drive connected the utility will prompt for exchange of disks.

The Memory Management facility incorporated in all the S1 micros permits the memory map to expand beyond the normal 64K memory map of 8 bit micros, to 1 MEGABYTE of addressable memory. This capability permits many software features not normally possible. For example, in the graphics mode the S1 has four separately addressable screens contributing to the single display - a text screen, and three graphics planes, one for each coloour, RED, GREEN, BLUE. This consumes 52K of RAM, almost the entire map of a normal 8 bit micro. The additional memory capacity permits many advanced features, from GET and PUT to the Image Generation system and the RAMDISK.

The RAMDISK is an area of memory organised to look like a disk drive. It can be accessed from a directory and is allocated in file blocks.

In the S1 system the RAMDISK grows as the requirement for disk space, within the limits of the available memory. To make effective use of this facility a 64K Ram card is recommended. The more memory the greater the potential disk space.

Some of the software now available for the machine reveals the power of the machine. A program called Micro Easel is for the S1 what MACPAINT is for the McIntosh. Uuotoy is a game which plays for days without any boring repetition and requires both skill and intelligence to play. There are several other games available and more on the way. A SEARCH utility is available to include a search command, which can be accessed from BASIC. In a recent programming contract I used this command to search a list of 2000 names, each fifteen characters long. The new command will find a matching name and display it in less than 2 seconds. The quickest I was able to do this in BASIC without the command was over four minutes.

There are several other utilities available, in the form of new commands, such as FIND, SORT, TRACE STEP and TRACE PRINT.

Together with the RAMDISK facility (provided as standard with the disk operating system) and the 1 Mbyte memory map, the S1 system is an extremely powerful device. In terms of value for money the S1/30 is hard to beat and is a really useable machine. The only thing clouding its future is the availability or otherwise of a wide selection of good software.

<<<<<<<<<< **THE END** >>>>>>>>>>

FOR SALE:

HITACHI MP-3550
- twin drives with both SD and DD Hitachi Controller cards : **$700.00**

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CONNECTING AN HITACHI MB6890(PEACH) TO AN IBM RGB MONITOR

By Cliff Hignett

The signals available on the 'colour' connector at the back of the 'Peach' don't match those of the IBM. This means that the range of monitors available are limited to what the Hitachi dealers can support, because the dealers of other monitors rarely know what the 'box' which they are selling does.

In a search of the available equipment I came across a monitor which is spectacularly better than the original Hitachi one (which was pretty good). For those who are interested this was a BRI-UP RGB monitor from Taiwan, marketed by Xenon world imports for $635 tax paid. The dot pitch is .31mm on a 14" black screen (yes Black, not grey), packaged in very attractive box which is only 37cm wide, which leaves room for a twin 1/2 height drive on top of the Peach as well. The band width is quoted as a very conservative 12MHz, but it is better than the Hitachi RGB.

Anyway, if you want to connect this or any other IBM colour monitor you will need the following very simple circuit. (Actually all the required signals are available inside the Peach, but I preferred to have something I could just plug in)
What you need
1) 8 pin DIN connector(male) to plug into the Peach colour socket($4.50)
2) 9 pin 'D' connector (female) into which the IBM monitor plugs. ($4.00)
3) 7805 regulator to convert 12v to 5v($1.00)
4) hex inverter chip. I used a 7404 ($0.50), but there are many others.
5) a couple of .1 microfarad capacitors ($0.50 each)
6) a couple of 2K ohm resistors (1/4 watt is enough)
7) a small piece of perforated circuit board about 2cmx6cm on which to mount the components.

I put the whole thing into the cable between the two plugs. The hardest part of the exercise is getting the pin numbers right on the DIN plug - the order is diabolical.

The circuit involves supplying +5v to the monitor as an 'intensity' signal and inverting the horizontal and vertical synch signals from the Peach. Connections are -

8 pin DIN (PEACH end)		9 pin 'D' socket (for IBM monitor)	
Pin	Function	Pin	Function
1	+12v from Peach	1	Ground
2	Ground	2	ground
3	Pedestal- not used	3	Red signal
4	HSYNCH (inverted)	4	Green signal
5	VSYNCH (inverted)	5	Blue signal
6	Red signal	6	Intensity signal
7	Green signal	7	not used
8	Blue signal	8	HSYNCH
		9	VSYNCH

(Warning - be careful of the order of pin numbers on the DIN plug)

```
+12v---------+------   7805   -----+--------------------+-+-----+5v---------->intensity
pin
            !              !      !                  ! !               &Pin 14 of
7404
        ===.1mf   !      ===.1 mf             / /
            !     !         !                 / /  2K ohm
0v----------------------------------->ground  / /
                       & Pin 7 of 7404       ! !
                                             ! !
HSYNCH ----------! 7404a    ---------------------+------------------>HSYNCH pin
               1            2                 !
                                              !
                                              !
               3            4                 !
VSYNCH-----------! 7404b    -------------------!------------------->VSYNCH pin
```

<<<<<<<<<< **THE END** >>>>>>>>>>

Software for HITACHI MB-6890 and MB-S1/10 available from

BJs SOFTWARE SYSTEMS
P.O. Box 191, ROSANNA, VIC. 3084

1. MICRO LEDGER V 2.31 (MB-6890 DSDD) $95.00
2. MICRO LEDGER V 3.0 (MB-S1/10) $95.00 need extra 128K RAM.
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9. BankLib (MB-6890 DSDD) $40.00
An alternative to Disk Based Commands.
See Bank Selectable Memory - Another look.

If you have previously purchased any of the above products from US and require an update simply return your purchased disk together with your $10.00 and your disk will be updated.

oooooOOOOOooooo

BOOT PROGRAM FOR THE MB-6890

By T.J. Murphy

Before you say not another one read on. It might be what you've been looking for. It is designed and intended to be used with " DISC BASED COMMANDS " DOS. The reason for this will become obvious when you understand how the program operates.

OPERATING INSTRUCTIONS.

To begin with the program asks for the drive number required. You must answer with a 0 or 1 otherwise nothing will happen, the program just sits patiently waiting for a correct response.

Once past that stage you will see information about the disk appear at the top of the screen, this may or may not be useful depending on personal taste. After a short interval the files on the selected disk will be displayed. At this point the main advantage of this program should become apparent, it uses the fact that the Disc Based Files command, lists files horizontally in four columns, when in 80 character mode and the file names appear fairly quickly. The other advantage is all of the 152 possible file names, (Assuming that a data disk with only single blocks are used) can be printed on screen at one time.

When files are on screen you can select the file you wish to use, with the arrow keys. The keyboard can be used as normal except for CLS, which doesen't function. The letters R, L, W, and C which select what you want to do with the file, cannot be printed on screen either. When moving the cursor vertically just use the vertical arrows (or CTRL ^ & CTRL) as normal. For horizontal movement use SHIFT and the arrow keys (or CTRL] & CTRL \ ).

==== IT IS IMPORTANT TO POSITION THE CURSOR AT THE FIRST CHARACTER POSITION OF A FILE NAME. ====

It is important to position the cursor at the beginning of the file name being selected as the file is read directly from the screen. This means that if file names scroll off the screen or are altered in any way the program will read incorrect information causing the program to stop and give an error message. There are other special cases when a file cannot be loaded or run. In general however this will not occur and no problems should arrise.

TIPS AND HINTS.

This program will still function on non DBCOMMAND systems and non horizontal filing DOSes but your in for trouble. The reason being that a files command is used in the program and it relies on how the DOS formats the screen.

For those without DBCOMMANDS you will need to delete or better still REM out line 10. If you don't like waiting for the few seconds after the disk information is put on screen then REM out line 340, this speeds things up and if that isn't fast enough put in line " 215 GOTO 340 ". For those of you who don't have colour it may pay to leave out colour statements as red and green are difficult to see on monochrome systems. There are probably many things you could do to improve this program for yourself, so I'll leave it to you.

One last thing. I take no credit for program lines 20 to 70 and 620 to 670 as they were taken from PUN.

```
10 DBNEWON 133
20 SCREEN 0,,1
30 FOR I=4 TO 9
40 READ J:POKE &HFFC6,I:POKE &HFFC7,J
50 NEXT I
60 POKE &HA5,&H14:POKE &H23A,50:POKE &H23C,49
70 DATA 63,6,50,55,&H83,6
80 'FILE name ............. " FIL DBC2 "  written by  T.J.MURPHY
90 COLOR 7:CLS:COLOR 2,0:CLEAR 550,&H8A20
100 LOCATE 10,10:PRINT "STATUS  and  FILES  from Drive ... 0
/ 1 :";:DRIVE$=INPUT$(1):PRINT DRIVE$;
110 IF DRIVE$<>"0" AND DRIVE$<>"1" THEN PRINT
CHR$(30)+CHR$(5):GOTO 100
120 KEY 1,"FILES "+CHR$(34)
130 KEY 2,"CONT "+CHR$(13)
140 KEY 3,"EDIT "
150 KEY 4,"LIST "+CHR$(13)
160 KEY 5,"RUN "+CHR$(13)
170 KEY 6,"R."+CHR$(34)+CHR$(13)
180 KEY 7,"SCREEN "
190 KEY 8,"COLOR "
200 KEY 9,"LOAD "+CHR$(34)
210 KEY 10,"SAVE "+CHR$(34)
220 DSKI$ VAL(DRIVE$),1,4,A$,B$:DCA$=LEFT$(A$,0):DSKI$
VAL(DRIVE$),1,3,A$,B$:C$=MID$(B$,50,72):DCB$=MID$(B$,49,1)
230 IFDCA$<> "!" AND DCB$<> "K" THEN LOCATE 40,0:PRINT"D A T A
D I S K  no DOS on DISK.";:GOTO280 ELSE GOTO 240
240 COLOR 6:LOCATE 30,0:FOR I=1 TO 36:CH$=MID$(C$,I,1):IF
CH$<CHR$(32) OR CH$>CHR$(126) THEN PRINT" ";:ELSE PRINT CH$;
250 NEXT
260 LOCATE 24,1:FOR I=36 TO 72:CH$=MID$(C$,I,1):IF CH$<CHR$(32) OR
CH$>CHR$(126) THEN PRINT" ";:ELSE PRINT CH$;
270 NEXT
280 COLOR 4:LOCATE 42,3:PRINT "Select files using     keys."
290 POKE&HFFD8,130:POKE&H52D,29:POKE&H52E,31:POKE&H52F,28:POKE&H4DE,30
300 BLOCKS=DSKF(VAL(DRIVE$)):COLOR 3:LOCATE 23,6:PRINT "Amount of
FREE space on DISK     ";BLOCKS;" Blocks."
310 LOCATE 48,8:PRINT "or":LOCATE 55,8:PRINT
INT(BLOCKS*2.048)*1000;" Bytes.":LOCATE 65,10:COLOR 10:PRINT "NEWON
";PEEK(&H248)
320 COLOR 5:LOCATE 0,0:KEY LIST:COLOR 7,0
330 LOCATE 18,15,3:PRINT "P r o g r a m   by  T. J. Murphy  ********. "
340 FOR I=1 TO 800 : NEXT I
```

```
350 CLS:LOCATE 0,0,3
360 COLOR 10,0:PRINT "       <R>u n , <L>o a d , <W>r i t e   a
program.  <C>h a n g e  drive.       ";
370 DRIVE$=DRIVE$+":":          COLOR 4    :FILES DRIVE$
380 FIL$="":FILNAME$="":EXT$="":TYPE$="":PRO$=""
390 Q$=INPUT$(1):XXX=POS(0):YYY=CSRLIN
400 IF Q$<>"R" AND Q$<>"L" AND Q$<>"W" AND Q$<>"C" THEN IF CHR$(12)=Q$
THEN GOTO 390 ELSE PRINT Q$;:GOTO 390
410 XXX=POS(0):YYY=CSRLIN
420 FOR I%=XXX TO XXX+19:PRO$=PRO$+CHR$(SCREEN(I%,YYY)):NEXT I%
430 FIL$=LEFT$(PRO$,8):EXT$=MID$(PRO$,10,3):PRO1$=MID$(PRO$,13,7)
440 FOR III%=1 TO 6:PRO2$=MID$(PRO1$,III%,1):IF PRO2$="0" OR PRO2$="1"
OR PRO2$="2" THEN TYPE$=PRO2$ ELSE IF PRO2$="A" OR PRO2$="B" THEN
TYPE2$=PRO2$
450 NEXT III%
460 FILNAME$=FIL$+"."+EXT$
470 IF EXT$="DAT" AND TYPE$="1" THEN CLS:COLOR 2:PRINT TAB(22)"N O T
an executable file." ELSE 490
480 FOR I%=1 TO 3000:NEXT:COLOR 7:GOTO 350
490 IT$=DRIVE$+FILNAME$
500 IF Q$="R" AND TYPE$="0" OR TYPE$="1" THEN 560
510 IF Q$="R" AND TYPE$="2" THEN 570
520 IF Q$="L" AND TYPE$="0" OR TYPE$="1" THEN 580
530 IF Q$="L" AND TYPE$="2" THEN 590
540 IF Q$="W" THEN 600
550 IF Q$="C" THEN 80
560 GOSUB 610:LOAD IT$,R   :GOTO 600
570 GOSUB 610:LOADM IT$,,R :GOTO 600
580 GOSUB 610:LOAD IT$     :GOTO 600
590 GOSUB 610:LOADM IT$    :GOTO 600
600 GOSUB 610:NEW
610 GOSUB 620:COLOR 7:CLS:KEY 2,"AUTO "
620 SCREEN 0,,0
630 FOR I=4 TO 9
640 READ J:POKE &HFFC6,I:POKE &HFFC7,J
650 NEXT I
660 POKE &HA5,&H0C:POKE &H23A,25:POKE &H23C,24
670 DATA 31,6,25,28,&H83,14
680 RETURN
```

<<<<<<<<< **THE END** >>>>>>>>>>

INTERFACING TO THE MB-6890

By P.F. CALDER

The MB-6890 has a number of means of talking to the outside world. These include a keyboard, screen, disc drives, parallel printer port, and serial port. However, these are dedicated to their own function, and do not support communication with any of a range of other devices that could be connected to the CPU. These include sensors of various kinds, such as switches, microphones, smoke detectors, movement detectors, and touch panels, as well as output devices such as relays, line drivers, voice modules and indicators. These components can be connected to the CPU via an interface board, resulting in a number of interesting projects.

With an Analog to Digital converter chip, a voice signal from a microphone could be digitized and stored on disc. With a frequency response tape or disc, the response of your Hi-Fi system to each frequency could be measured and plotted on the screen. Using programmable input/output lines, model trains could be controlled by reading track detectors for their positions, setting track switches to route them around obstacles, and avoiding collisions by setting signals. A Digital to Analog converter could be used to control the train's speed, and stop them at red lights. Burglar alarms, fire alarms, and watering systems could easily be made to run from your computer.

The list is limited only by imagination. It needs only a little knowledge of electronics, some understanding of your computer and of the circuit building blocks that are available to the experimenter, for these projects to come to fruition. In a series of articles, of which this is the first, I will attempt to show how a number of interfaces could be put together to help make your PEACH more useful around the home.

INTERFACE SOCKETS

The MB-6890 has six interface sockets on the main board for the purpose of interfacing to I/O devices. The pins of the sockets connect to the address and data bus of the CPU chip (6809), and to several other lines used to control data transfer on the bus. The pin numbers with the signal meanings are listed in TABLE 1. (A more complete description of these signals by Dan Soussi is in PUN,Vol 2, No 3, Jun 84). Note that some lines are INPUT to the CPU (eg IRQ), others are OUTPUT by the computer (eg R/W OUT), while others are bi-directional (eg address and data bus).

NOTE: Some lines are true when in the 0V state, i.e. active low. These are designated with a "/" in front of them. Lines not so marked are active high, i.e. they are at +5V when true.

A printed circuit board plugged into any of these I/O sockets can make use of these signals, and so devices on the board can control, or be controlled by, the computer. The MB-6890 PROTO CARD, available from the author, is one such board suitable for building one of these interfaces.

MEMORY MAPPED I/O

Interfacing to the MB-6890 is done on a memory mapped basis. That is, the I/O device is made to look like one or more memory locations in the computers memory space.

For example, the double density disc controllor uses 5 addresses for setting the desired track and sector, reading and writing data, and checking for errors. The MB-6890 sets aside 256 addresses (the I/O page) for these I/O locations, although they could theoretically be anywhere in the address space. This I/O page spans from &HFF00 to &HFFFF. Some of these locations are already used, as can be seen by listing this area of memory using the Monitor. TABLE 2 shows a list of the addresses and their uses, known to the author.

The address bus is a set of 16 lines which, when decoded as a binary number, define an integer between 0-65536. The CPU operates on this address bus, defining the address that it wants to talk to next. The I/O page has an address that has the most significant 8 bits all ones. That is, lines A8-A15 are all true. The least significant 8 bits define any specific address within the I/O page.

Information is transferred to/from the CPU via the data bus. This is a set of 8 lines which the CPU reads from or writes to, as a parallel byte. A control line (R/W OUT) is set by the CPU to tell any device that is listening, when the CPU is reading or writing. For instance, memory needs to know if the CPU is supplying a new value, or whether it needs to read the value the memory currently has in the location being addressed. It is important, obviously, that any device connected to the data bus does not interfere with other devices connected to the bus, and stop them responding to their addresses and supplying their data when called upon.

In general, then, interfacing involves two functions:

1) responding to a specific set of addresses and

2) transfering data to or from the I/O device when addressed.

GENERAL PURPOSE CHIPS

Chip manufacturers have tried to make things easier for us by producing special interfacing chips which can be connected directly to the data bus. All that is then required is to provide some form of address selection to activate the chip.

The two most useful chips are:

1. Peripheral Interface Adapter (PIA) - MC6821. This provides two 8-bit parallel ports, i.e. 16 I/O lines, and uses 4 addresses, two for each port. Each port has two additional lines for external device control. The PEACH already contains one of these chips, with port A used for memory bank switching, and port B used for the parallel printer, see TABLE 2.

2. Asynchronous Communication Interface Adapter (ACIA) - MC6850. This device does all the hard work of converting serial data to parallel data, and vice versa. It has a serial in and a serial out line, and uses 2 addresses. Several other control lines are provided for external device control, e.g. modem. The MB-6890 already has one of these chips which is used for cassette I/O or serial I/O, but not at the same time. The serial I/O mode can be used for a serial printer or a modem, see TABLE 2.

LEVENTHAL in "6809 Assembly Language Programming", has two chapters devoted to these two chips, and gives good coverage of the subject.

PARALLEL PORT INTERFACING

One of the most common means of interfacing is via a PIA. This chip provides two 8-bit ports that can be programmed as either input or output lines. In addition, there are two other lines associated with each port for controlling peripherals. Figure 1 gives a brief description of the 6821 chip, and the pin outs.

The two ports of the 6821 PIA are programmed in the same way, but they are electrically different. The prime difference is that port A is designed to drive CMOS logic and has internal pull-up resistors, while port B has not. Port B has tri-state lines which enter a high impedence state when the port is used in input mode. Port A seems to be designed primarily as an input port, while port B has some features that make it more useful as an output port. Port B can source 1 mA, thus directly driving a single transistor switch. In addition, one of the control lines of port B can be programmed to output a pulse when data is available, thus making it useful for handshaking, particularly when used as a CENTRONICS printer interface.

Note, the 6820 is an earlier version of the PIA, and is very similar to the 6821. The major difference is in the limited driving capability of the 6820 port B.

PIA ADDRESSING

The PIA occupies 4 consecutive locations from a base address, two for selecting the internal registers of port A, and two for port B.

The PIA has two pins, RS0, RS1, which are used to select one of the 4 internal port registers. These are often connected to address lines A0, and A1.

In addition, the PIA has three pins which assist in making chip selection relatively straight forward. All three chip select (CS) lines must be true to select the chip.

CS0	This line must be high to be true,
CS1	ditto,
/CS2	This line must be low to to be true.

The other address lines (A2-A15) must be decoded to provide the base address of the PIA, and these chip select lines assist in minimumizing package count. In a particular application, not all the CS pins will be required for address selection. However, the unused lines must be held true, so that they will not stop those that are used from activating the chip.

Address selection then, requires the decoding of address lines A2-A15 to match a particular base address, with lines A0 and A1 picking one of 4 addresses immediately above the base address, as the diagram shows. For example, the PIA already in the MB-6890 has a base address of &HFFC0. Addresses &HFFC0,&HFFC1 refer to port A, and &HFFC2,&HFFC3 to port B.

```
                           --------------
                          |          PA0|-------
A0 -----------------------|RS0        . |....    port A
A1 -----------------------|RS1       PA7|-------
       ------------       |    PIA      |
A2 --|             |------|CS0       PB0|-------
.    |             |------|CS1        . |....    port B
A7 --|             |------|/CS2      PB7|-------
     | address     |      |             |
     | decoding    |       --------------
A8 --|             |
.    |             |
A15 -|             |
       ------------
```

The MB-6890 has already done some I/O page address decoding for us. Two lines on the I/O sockets, /EX-IO and /EX-IO2, are true (low) whenever an address is in the range &HFF00-&HFF7F, and &HFF80-&HFFBF respectively. Thus we only need to decode address lines A2-A6 and combine the result with /EX-IO or /EX-IO2, depending in which half of the I/O page our address is in.

ADDRESS WITHIN THE I/O PAGE

We must decide where in the I/O page to locate the device addresses. The MB-6890 assumes that certain devices will operate out of certain addresses, so we don't want to conflict with them. TABLE 2 is a list of those addresses known to me.

A good design of general purpose address decoding logic should allow our device address block to be located anywhere in the I/O page, by using a set of jumpers on the card. Then, if conflict arises, the address block can be changed relatively simply by altering the jumpers. If the address is known precisely, it could be decoded explicitely.

PRACTICAL PIA ADDRESS DESIGNS

Chip manufacturers have come to our rescue again by providing chips useful in address decoding. These are in the form of multiple input comparators, ALL of whose inputs must match another set of inputs before the output is true. By comparing the address lines A2-A6 with comparison lines held high or low, an appropriate address match can be made.

These chips include the following:-

DM8131	6-bit comparator, output active low
DM8136	6-bit comparator, output active high
74LS85	4-bit comparator, output active low
74LS138	1 of 8 decoder, outputs active low

You may need the data sheets, obtainable from your IC supplier, for these chips. The front page of the data sheets showing the pinouts is included in figures 2a, 2b, 2c.

ONE-CHIP/ONE PIA SCHEME

A one-chip address decoder can be made using the 6-bit comparator DM8136 (from National Semiconductor), as in figure 3. The comparison includes /EX-IO, and the remaining address lines A2-A6, to form a true or false result at the output (pin 9). This output is high when it is true, so the CS1 line is used to select the PIA. The two unused PIA chip select lines (CS0, /CS2) are held high and low respectively, to make them true.

Note that the DM8131 chip could be used, with the output going to /CS2.

In the DM8136, the address lines (A2-A6) are compared with lines held either high or low. Each comparison line is connected to +5V through a 10k pull-up resistor. If the pad at the end of each resistor is left open, the comparison voltage will be +5V, i.e. a logic 'one'. If the pad is connected to 0V, the comparison voltage will be 0v, i.e. a logic 'zero'. Thus, by connecting the appropriate jumpers to 0v, a suitable base address can be set up for the PIA.

Note that several other control lines must be connected to the PIA for bus control. These are:-

E This is the basic system clock signal used by all chips,

R/W OUT This is true when the CPU is reading the bus,

/RES RES is held low when the reset button is pushed, and clears the PIA.

ONE-CHIP/TWO PIA SCHEME

The same address decoding scheme can be used for two PIA's, except that use is made of the PIA's own chip selects, figure 4. With two PIA's, 8 addresses are required, needing three lines for selection. Address lines A0, A1 are used as before, connected to RS0 and RS1. However, address line A2 is connected to CS0 of one PIA, and /CS2 of the other. Thus, when A2 is true, CS0 of PIA1 will be true, but /CS2 of PIA2 will be false, and vice versa, thus selecting only one of the PIA's. Address lines A3-A6 are decoded in the DM8136 and the output connected to CS1 of both chips. One of the pair of comparison lines of the DM8136 will be unused. This pair of lines should be connected to make its comparison always true i.e. both lines high, or both low.

TWO CHIP SCHEME

Use can be made of two 74LS85 4-bit comparators to perform similar decoding, figure 5. In this case, the result of the EQUALS comparison (pin 6) in the first comparator is connected to the EQUALS IN (pin 3) of the second chip. The /EX-IO line acts as one of the lines to be compared (it must be low to be true), along with the address lines A2-A6. Note that the output of this chip is high, so CS0 is used to select the PIA.

If two PIA's are required, address line A2 must be connected to CS1 of one PIA, and to /CS2 on the other one. The CS0 input line of both PIA's is connected to the decoder output, pin 6 of chip 2.

DIRECT DECODING

If the base address is known to be fixed, it can be directly decoded as in figure 6. The base address &HFF60 is decoded in this diagram. Inverters (74LS04) are used to negate those lines that must be low to be true (including /EX-IO), and the 6 lines combined in an 8-input NAND gate (74LS30). The two unused inputs must be held high to stop them effecting the output. The output of thr NAND gate must be connected to the /CS2 pin of the PIA.

Even if you don't use this scheme with your projects, the knowledge helps in understanding other published circuits. Geoff Drury's clock circuit uses two 74LS138 chips to decode addresses &HFF38, &HFF39, &HFF3A. These addresses are determined by the PEACH ROM and will not change. Look up the circuit in PUN ,Vol 2, No 1, April 84, and see if you can follow the address decoding logic.

NEXT ISSUE

Next issue of **Phase** will hopefully include the next article in the series, on programming the PIA interface. Subsequent articles will deal with A/D input/output devices, and a useful partially decoded I/O bus that provides a generalized mechanism for interfacing to peripherals.

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(1.5 MHz)
MC68B21
(2.0 MHz)

PERIPHERAL INTERFACE ADAPTER (PIA)

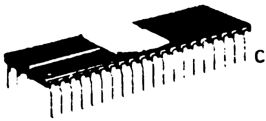
The MC6821 Peripheral Interface Adapter provides the universal means of interfacing peripheral equipment to the M6800 family of microprocessors. This device is capable of interfacing the MPU to peripherals through two 8-bit bidirectional peripheral data buses and four control lines. No external logic is required for interfacing to most peripheral devices.

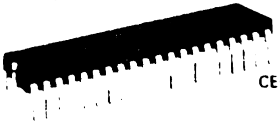
The functional configuration of the PIA is programmed by the MPU during system initialization. Each of the peripheral data lines can be programmed to act as an input or output, and each of the four control/interrupt lines may be programmed for one of several control modes. This allows a high degree of flexibility in the overall operation of the interface.

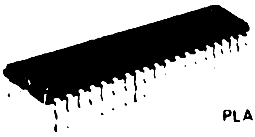
- 8-Bit Bidirectional Data Bus for Communication with the MPU
- Two Bidirectional 8-Bit Buses for Interface to Peripherals
- Two Programmable Control Registers
- Two Programmable Data Direction Registers
- Four Individually-Controlled Interrupt Input Lines, Two Usable as Peripheral Control Outputs
- Handshake Control Logic for Input and Output Peripheral Operation
- High-Impedance Three-State and Direct Transistor Drive Peripheral Lines
- Program Controlled Interrupt and Interrupt Disable Capability
- CMOS Drive Capability on Side A Peripheral Lines
- Two TTL Drive Capability on All A and B Side Buffers
- TTL-Compatible
- Static Operation

MOS
(N-CHANNEL, SILICON-GATE,
DEPLETION LOAD)

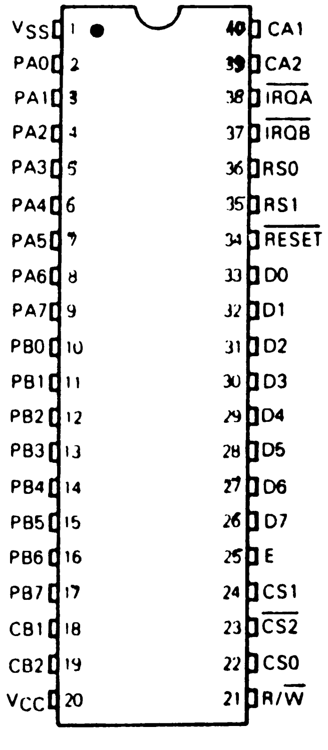
PERIPHERAL INTERFACE ADAPTER


L SUFFIX
CERAMIC PACKAGE
CASE 715


S SUFFIX
CERDIP PACKAGE
CASE 734


P SUFFIX
PLASTIC PACKAGE
CASE 711

PIN ASSIGNMENT



MAXIMUM RATINGS

Characteristics	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 to +7.0	V
Input Voltage	V_{in}	-0.3 to +7.0	V
Operating Temperature Range MC6821, MC68A21, MC68B21 MC6821C, MC68A21C, MC68B21C	T_A	T_L to T_H 0 to 70 -40 to +85	°C
Storage Temperature Range	T_{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance Ceramic Plastic Cerdip	θ_{JA}	 50 100 60	°C/W

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields, however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum-rated voltages to this high impedance circuit. Reliability of operation is enhanced if unused inputs are tied to an appropriate logic voltage (i.e., either V_{SS} or V_{CC}).

Figure 1

Proprietary DM71/DM8131,36

6-Bit Unified Bus Comparators

General Description

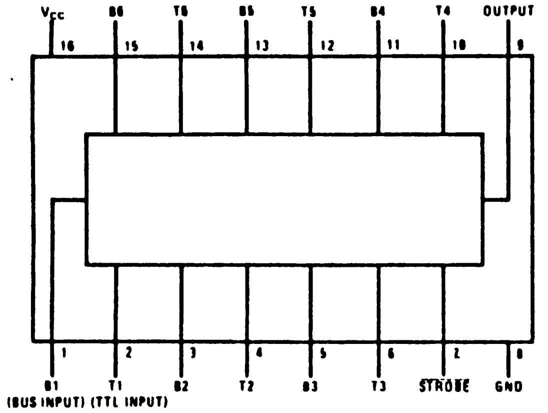
The DM7131/DM8131, DM7136/DM8136 compare two binary words of two-to-six-bits in length, and indicates matching (bit-for-bit) of the two words. Inputs for one word are 54/74 series-compatible TTL inputs, whereas those of the second word are high-impedance receivers driven by a terminated data bus. These bus inputs include 0.65V typical hysteresis, which provides 1.4V noise immunity. The DM7131/DM8131 has active pull-up outputs and goes to the low state upon equality. The DM7136/DM8136 has open-collector outputs which go to the high state upon equality, and is expandable to n bits by collector-ORing. Both devices have an output latch which is strobe controlled.

The transfer of information to the output occurs when the $\overline{\text{STROBE}}$ input goes from a logic "1" to a logic "0" state. Inputs may be changed while the $\overline{\text{STROBE}}$ is at the logic "1" level, without affecting the state of the output. These devices are useful as address comparators in computer systems utilizing unified data bus organization.

Features

■ Low bus input current	15μA typ
■ High bus input noise immunity	1.4 typ
■ Bus inputs comply with IEEE 488-1975	
■ TTL-compatible output	
■ Output latch provision	

Connection Diagram



7131(J), (W); 8131(J), (N), (W);
7136(J), (W); 8136(J), (N), (W)

Truth Table

CONDITION	$\overline{\text{STROBE}}$	OUTPUT	
		DM71/8131	DM71/8136
T = B, T ≠ B	H	Q_{N-1} *	Q_{N-1} *
T = B	L	L	H
T ≠ B	L	H	L

*Latched in previous state

Logic Diagram

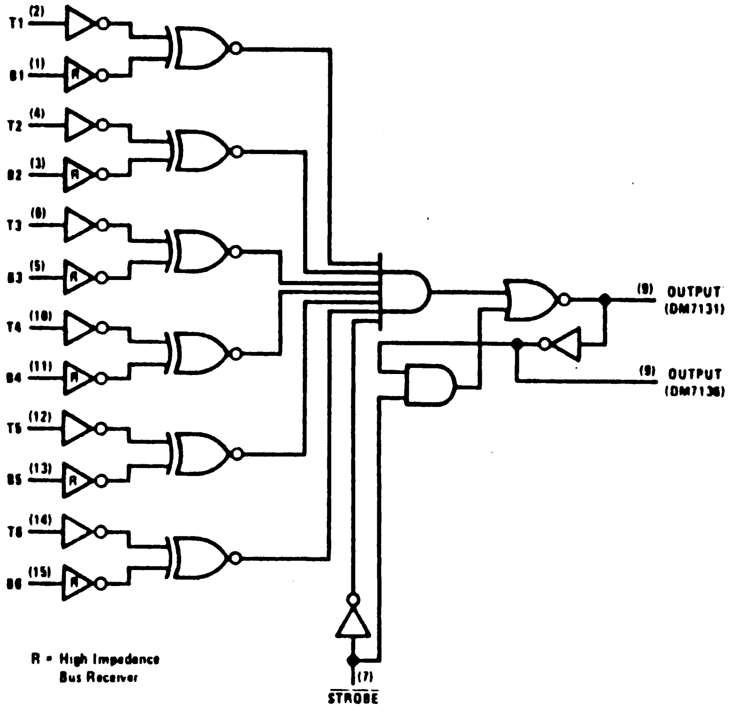


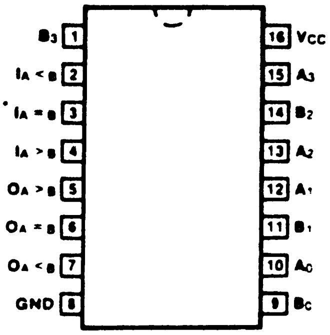
Figure 2a

54/7485
54LS/74LS85
4-BIT MAGNITUDE COMPARATOR

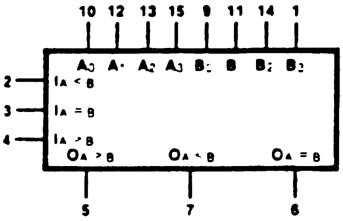
DESCRIPTION — The '85 is a high speed, expandable 4-bit magnitude comparator which compares two 4-bit words in any monotonic code (binary, BCD or other) and generates three outputs: A less than B, A greater than B, and A equal to B. Three expansion inputs allow serial (ripple) expansion over any word length without external gates.

- **EASILY EXPANDABLE**
- **BINARY OR BCD COMPARISON**
- **A > B, A < B, A = B OUTPUTS AVAILABLE**

CONNECTION DIAGRAM
PINOUT A



LOGIC SYMBOL



V_{CC} = Pin 16
GND = Pin 8

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V_{CC} = +5.0 V ±5%, T_A = 0°C to +70°C	V_{CC} = +5.0 V ±10%, T_A = -55°C to +125°C	
Plastic DIP (P)	A	7485PC, 74LS85PC		9B
Ceramic DIP (D)	A	7485DC, 74LS85DC	5485DM, 54LS85DM	6B
Flatpak (F)	A	7485FC, 74LS85FC	5485FM, 54LS85FM	4L

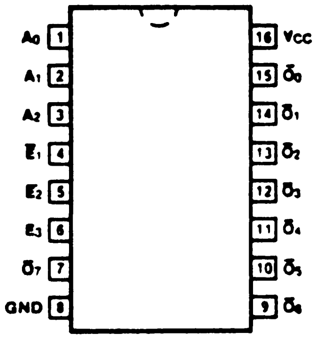
INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74 (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
$A_0 - A_3$	Word A Inputs	3.0/3.0	1.5/0.75
$B_0 - B_3$	Word B Inputs	3.0/3.0	1.5/0.75
$I_{A=B}$	A = B Expansion Input	3.0/3.0	1.5/0.75
$I_{A<B}$, $I_{A>B}$	A < B, A > B Expansion Inputs	1.0/1.0	0.5/0.25
$O_{A>B}$	A Greater Than B Output	10/10	10/5.0 (2.5)
$O_{A<B}$	A Less Than B Output	10/10	10/5.0 (2.5)
$O_{A=B}$	A Equal B Output	10/10	10/5.0 (2.5)

Figure 2b

54S/74S138
54LS/74LS138
1-OF-8 DECODER/DEMULTIPLEXER

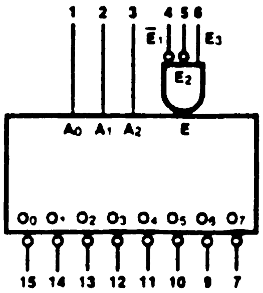
CONNECTION DIAGRAM
PINOUT A



DESCRIPTION — The '138 is a high speed 1-of-8 decoder/demultiplexer. This device is ideally suited for high speed bipolar memory chip select address decoding. The multiple input enables allow parallel expansion to a 1-of-24 decoder using just three '138 devices or to a 1-of-32 decoder using four '138 devices and one inverter. The '138 is fabricated with the Schottky barrier diode process for high speed.

- **SCHOTTKY PROCESS FOR HIGH SPEED**
- **DEMULTIPLEXING CAPABILITY**
- **MULTIPLE INPUT ENABLE FOR EASY EXPANSION**
- **ACTIVE LOW MUTUALLY EXCLUSIVE OUTPUTS**

LOGIC SYMBOL



V_{CC} = Pin 16
GND = Pin 8

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V_{CC} = +5.0 V ±5%, T_A = 0°C to +70°C	V_{CC} = +5.0 V ±10%, T_A = -55°C to +125°C	
Plastic DIP (P)	A	74S138PC, 74LS138PC		9B
Ceramic DIP (D)	A	74S138DC, 74LS138DC	54S138DM, 54LS138DM	6B
Flatpak (F)	A	74S138FC, 74LS138FC	54S138FM, 54LS138FM	4L

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74S (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
$A_0 - A_2$	Address Inputs	1.25/1.25	0.5/0.25
$\overline{E}_1$, $\overline{E}_2$	Enable Inputs (Active LOW)	1.25/1.25	0.5/0.25
E_3	Enable Input (Active HIGH)	1.25/1.25	0.5/0.25
$\overline{O}_0 - \overline{O}_7$	Outputs (Active LOW)	25/12.5	10/5.0 (2.5)

Figure 2c

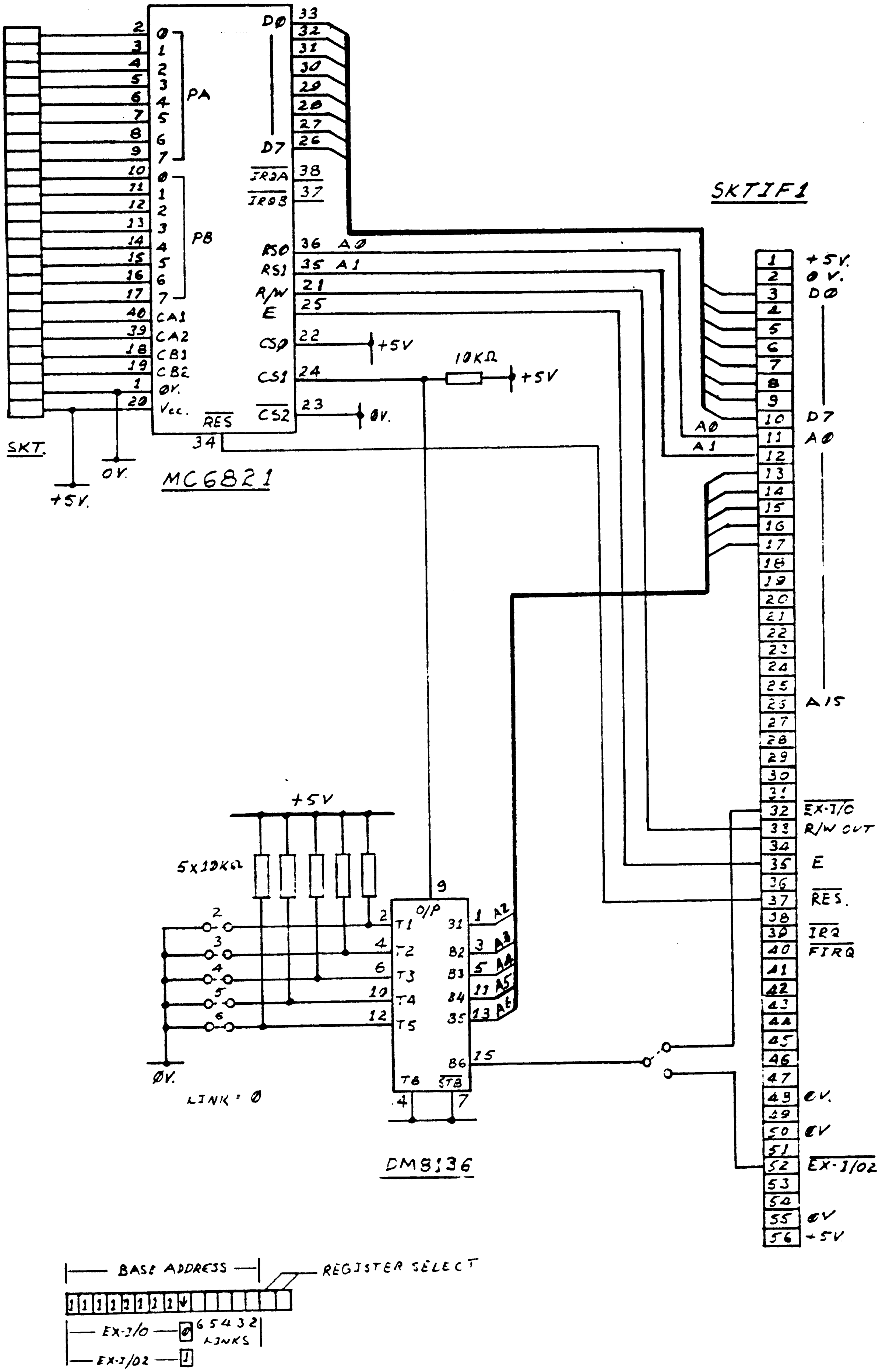


Figure 3: One Chip Decoder – One P.I.A.

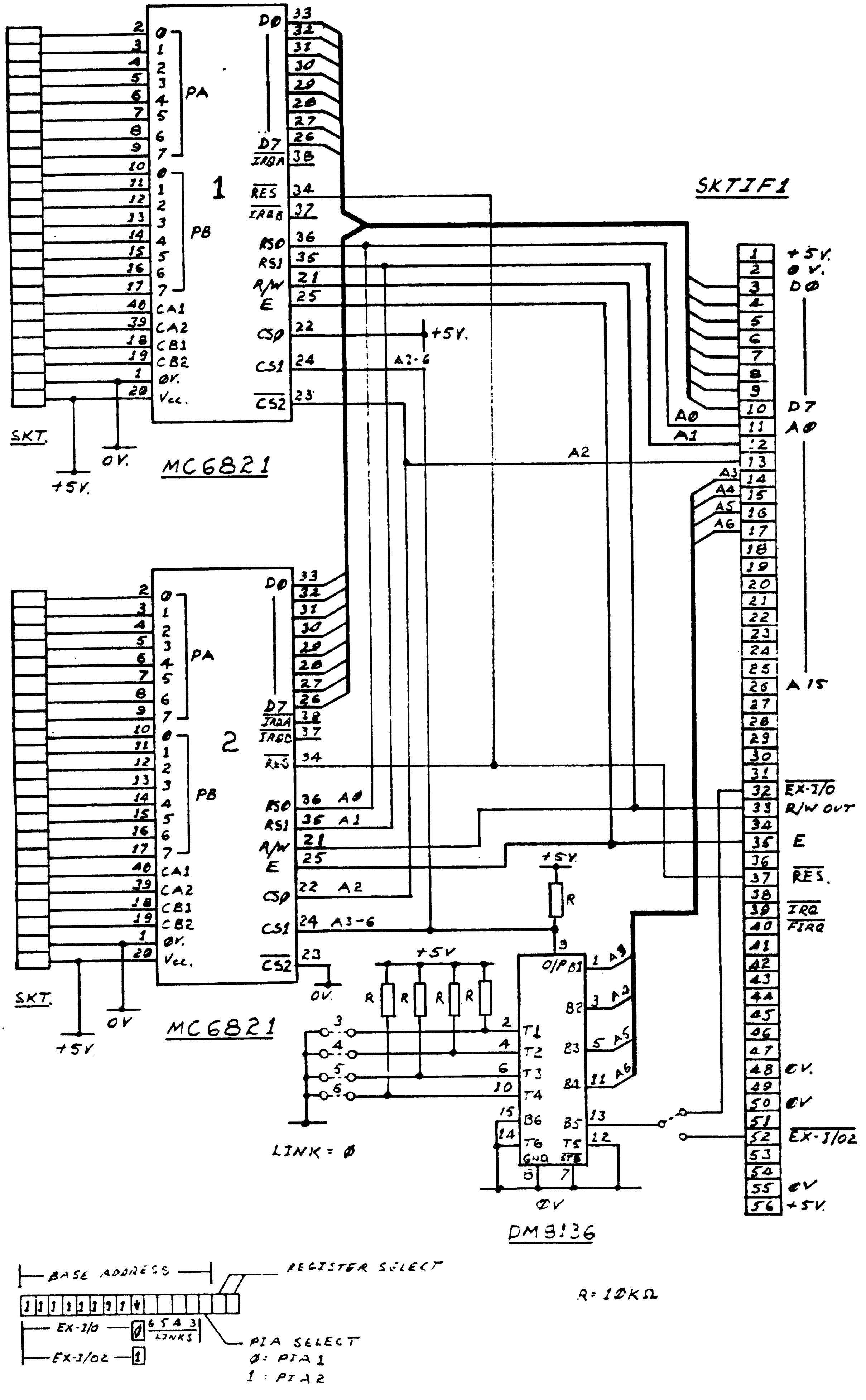


Figure 4: One Chip Decoder – Two P.I.A's.

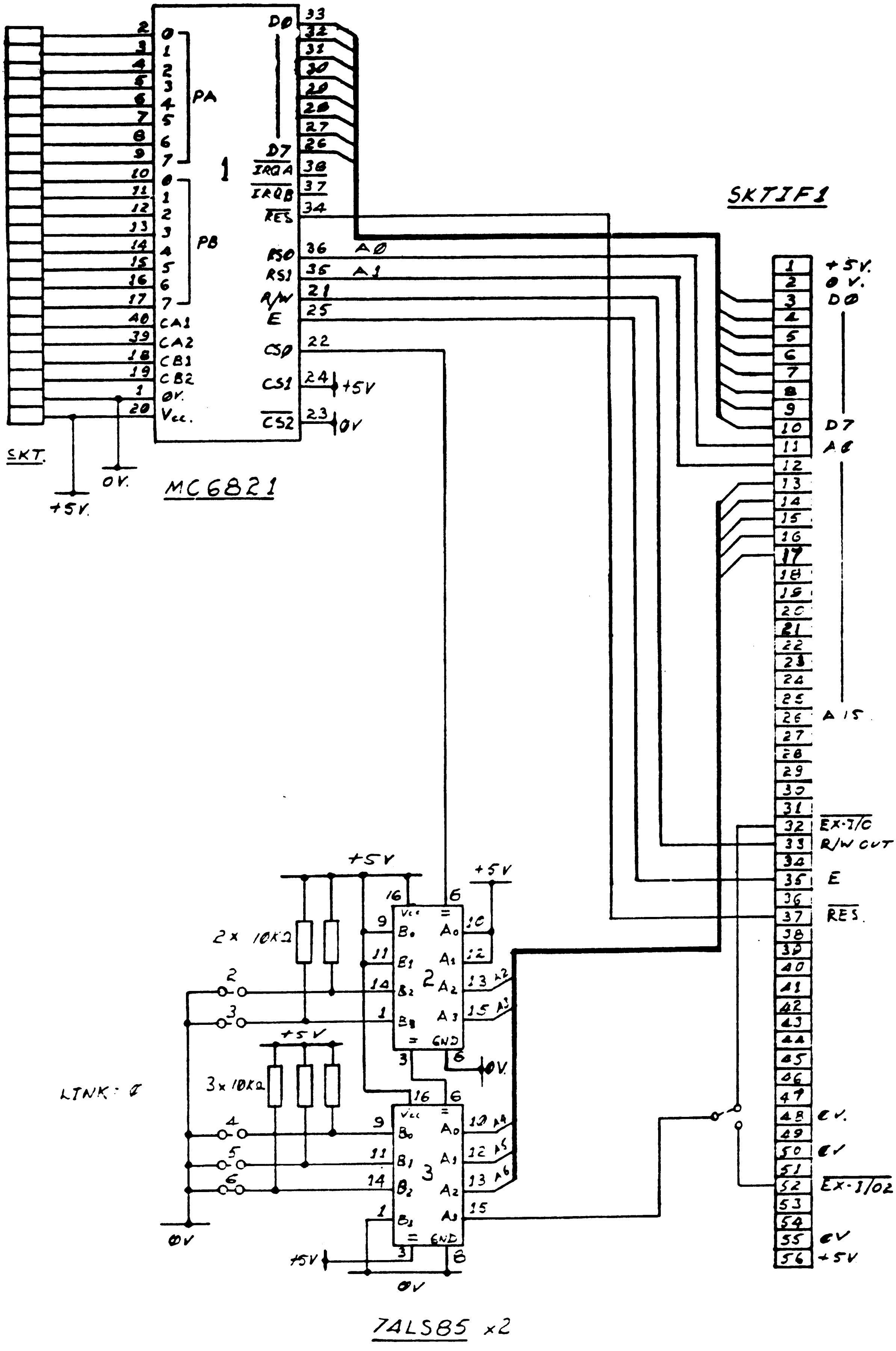
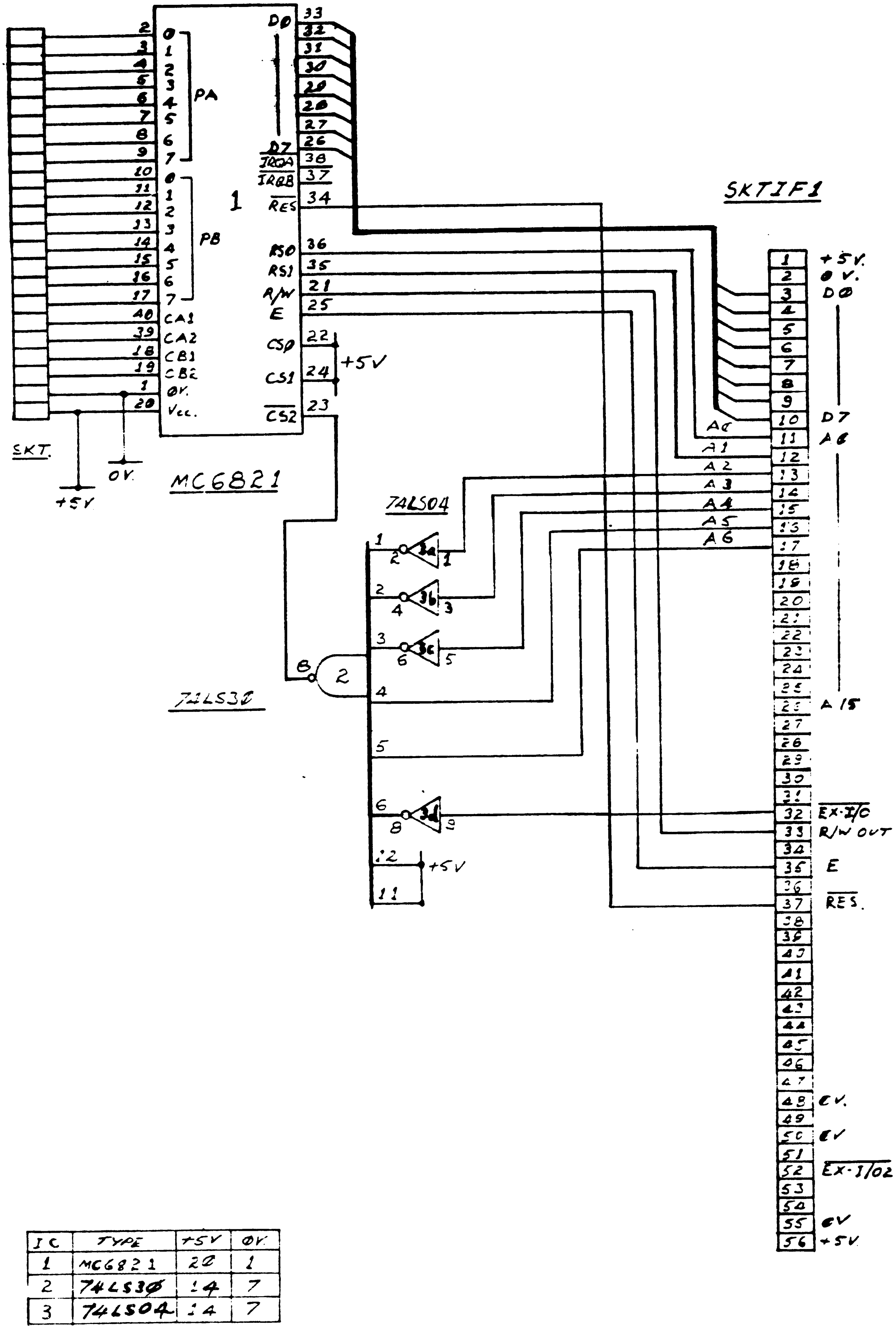


Figure 5: Two Chip Decoding - One P.I.A.



IC	TYPE	+5V	0V.
1	MC6821	20	1
2	74LS30	14	7
3	74LS04	14	7

Figure 6: Direct Decoding Base Address FF60

PIN	SIGNAL	DIR	FUNCTION
1	+5V	0/P	+5V Power supply rail
2	GND	I/0	Signal and power ground
3-10	D0-D7	I/0	Data bus (8 lines)
11-26	A0-A15	I/0	Address bus (16 lines)
27	BA	0/P	Bus available
28	BS	0/P	Bus status
29	/ROM-KIL	I/P	Disable system ROM from address bus
30	/EXROM-KIL	0/P	System ROM is off address bus
31	R/W-IN	I/P	Peripheral read/write to data bus
32	/EX-IO	0/P	Address is between FF00 and FF7F
33	R/W-OUT	0/P	Buffered output of R/W
34	VMA-OUT	0/P	Valid memory address acknowledge
35	E	0/P	Clock: Data is latched on falling edge of E
36	Q	0/P	Clock: Address is valid on rising edge of Q
37	/RES	0/P	A CPU reset is in progress
38	/NMI	I/P	Non-maskable interrupt request
39	/IRQ	I/P	Normal interrupt request
40	/FIRQ	I/P	Fast interrupt request
41	/HALT	I/P	Halt request
42	/VMA-CTRL	I/P	Peripheral valid memory address
43	/DMA	I/P	Direct memory access request
44	/BANK-SW	0/P	System/peripheral memory swap
45	HALT-ACK	0/P	Halt acknowledge
46	SOUND-IN	I/P	Analog input of audio signal
47	16MCK	0/P	16 MHz system clock
48	GND	I/0	Signal and power ground
49	2MCK	0/P	2 MHz system clock
50	GND	I/0	Signal and power ground
51	-5V	0/P	-5V power supply rail
52	/EX-IO2	0/P	Address is between FF80-FFBF
53	-12V	0/P	-12V power supply rail
54	+12V	0/P	+12V power supply rail
55	GND	I/0	Signal and power ground
56	+5V	0/P	+5V Power supply rail

note: "/" means logic low to be true

TABLE 1: Interface socket signals

	ADDRESS	USE
	(FF00-FF04	5 inch DD and 8 inch disc controllers
	(....	
	(FF18-FF20	5 inch SD disc controller
	(....	
	(FF34-FF37	Rob's multicard PIA
	(FF38-FF3A	Real time clock
EX-IO	(FF3B	unused
	(FF3C-FF3D	LPT1 PIA (port A)
	(FF3E-FF3F	LPT2 PIA (port B)
	(FF40-FF41	COM1 ACIA
	(FF42-FF43	COM2 ACIA
	(FF44-FF45	COM3 ACIA
	(FF46-FF47	COM4 ACIA
	(....	
	(FF7F	
	(FF80	
	(....	
	(	
EX-IO2	(FF90-FF9F	MC7910 MODEM CARD
	(....	
	(FFBF	
	FFC0-FFC1	Memory bank switch PIA (port A)
	FFC2-FFC3	Parallel printer PIA (port B)
	FFC4-FFC5	Serial port (ACIA)
	FFC6-FFC7	CRTC register
	FFC8	Break flag
	FFC9	Dip switch
	FFCA	Timer IRQ
	FFCB	LPEN IRQ
	FFD0	Mode select
	FFD1	Trace flag
	FFD2	Cassette relay
	FFD3	Sound bit
	FFD4	Timer IRQ enable
	FFD5	LPEN enable
	FFD6	Interlace register
	FFD7	
	FFD8	Colour register
	....	
	FFE0	KYBD enable flag
	....	
	FFF2	SWI3 interrupt vector (&H100)
	FFF4	SWI2 " " (&H103)
	FFF6-FFF7	FIRQ " " (&H10F)
	FFF8-FFF9	IRQ " " (&H10C)
	FFFA-FFFB	SWI " " (&H106)
	FFFC-FFFD	NMI " " (&H109)
	FFFE-FFFF	RESET " " (&HEED7) COLD START

ADDRESS

TABLE 2: I/O Page allocations

<<<<<<<<<< **THE END** >>>>>>>>>>

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TRACE STEP	step through a program one line at a time !!!!

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SA HITACHI GROUP NEWS

By Cliff Hignett

We start the new year well with three new members, all beginners. I hope that we can get more involvment from the beginners this year, and as a starter I am going to ask each member to present a review of a program to a meeting sometime during the year. The program can be yours, a commercial program or a public domain program. I hope also that the 'volunteer' will write a short (1/2 page) review for TAP (The Australian Phase). Perhaps we can persuade Wayne to come up with a T shirt (hint!, hint!). **(Just specify the size - W.H.)**

Our meeting format will change a little. We will meet as a group only on the even numbered months, with the alternate meetings (odd months) to go to meetings of the SA micro Group (our parent group), so that we can take advantage of the wider subject matter offered by the larger body. The SA Micro group meets on the 2nd Friday of (every) month at the Institute of Engineers, 11 Bagot Street, North Adelaide. Fees ($10) are due and should be paid to - Sa Micro group c/o R Mathews, 9 Angelsey Ave., St Georges 5064. Visitors are always welcome at meetings if you want to have a look first.

********************** MEETING LIST 1985 ***********************

10th May	Friday	7:30pm	Inst. of Engineers 11 Bagot St North Adelaide
15th June	Saturday	2:00pm	45a Ormond Ave Daw Park 5041
12th July	Friday	7:30pm	Inst. of Engineers 11 Bagot St North Adelaide
16th August	Friday	7:30pm	6 Gambia Ave Hampstead Gdns 5086
13th September	Friday	7:30pm	Inst. of Engineers 11 Bagot St North Adelaide
6th October	Sunday	2:00pm	45a Ormond Ave Daw Park 5041
8th November	Friday	7:30pm	Inst. of Engineers 11 Bagot St North Adelaide
8th December	Sunday	7:30pm	14 Sandy Crs Salisbury 5019

****

VICTORIAN CLUB NEWS

by Branko COLAVIZZA

As new technology inproves computers our own ideas must also change with them and therefore the time has come to change the user groups name so that we do not appear to be singularly involved with the one type of machine.

Therefore the MELBOURNE PEACH USERS GROUP has changed its name to **HITACHI USERS GROUP - MELBOURNE** whose postal address remains the same at,

P.O. Box 191, ROSANNA, Vic. 3084

and we meet on the first Friday of every month at 8pm sharp (all visitors welcome) at the,

TEMPLESTOWE TECHNICAL SCHOOL
CYPRESS AVENUE, TEMPLESTOWE 3106.

Along with the name change we also have a committee change which is as follows:

Chairman : ROBERT FLEGG (03) 718 2872
Secretary & Treasurer : BRANKO COLAVIZZA (03) 434 2541
Book Library : KEVIN GORIE (03) 729 1898

oooooOOOOOooooo

Along with these changes the PEACH PUBLIC DOMAIN has also changes its name to

HITACHI PUBLIC DOMAIN
P.O. Box 191, ROSANNA, VIC. 3084

I would like to make a suggestion to all the PEACH users who are still contributing towards to PUBLIC DOMAIN that in your programs you include your name, NEWON mode and if you have more that one module that the file names have some form of order amongst them as it is rather time consuming to determine which programs make up the module. YOUR CONTRIBUTIONS HAVE ALSO BEEN COMMING IN RATHER SLOW.

oooooOOOOOooooo

<<<<< THE END >>>>>

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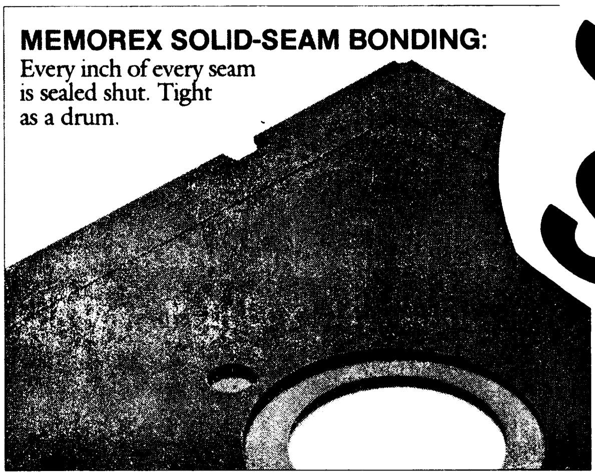

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Right, I have caught your attention. The subscription rate has been raised. It will be $30.00 for ten issues on and from the 1st April, 1985.

By way of explanation, I have received comments that the cover price has now reached $3.50 and that some people would question the worth of PHASE at that price. The cover price is set to permit local dealers to purchase copies at a reduced price and still make a reasonable margin. The cover price has no bearing on the subscription rate. I set the subscription rate to provide an adequate margin on costs to prevent from having to pay money out of my own pocket to print the issues. Unfortunately, most of the new equipment acquired is paid for out of my pocket and only gradually gets reimbursed from Micro Innovation Engineers. One observation passed recently said "we want communication not quality". I agree, but the improvement in quality has occurred for more than just aesthetic reasons. Imagine folding a forty page document, twice per copy, 400 times and then individually wrapping them each month! It was sending us mad. Hence the change to envelopes, as well as improving the quality, is doing a lot towards my retaining my sanity. It would appear that we will soon be producing in excess of 500 copies per month and I can't imagine trying to hand fold all those copies!! So whilst the numbers increase it does not necessarily mean increased economy as we must move to new production techniques to cope with the volume.

THE NEW RATE IS $30.00 FOR TEN ISSUES

<<<<<< ---------- >>>>>>

EXPIRY OF YOUR SUBSCRIPTION

I do not send letters of warning to subscribers when their ten issues are up. Instead I stamp the inside cover of PHASE with the message "SUBSCRIPTION DUE". I do this when two more issues remain in your subscription. This is to give you advanced warning. So when you first see the stamp, you have two month's in which to renew your subscription. The stamped message will continue to appear until the subscription is renewed or expires. When the subscription expires - no more THE AUSTRALIAN PHASE. Its really simple, isn't it!

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